

ENVIRONMENTAL ASSESSMENT BOARD



ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARINGS

VOLUME: 7

DATE: Wednesday, May 1, 1991

BEFORE:

HON. MR. JUSTICE E. SAUNDERS CHAIRMAN


DR. G. CONNELL MEMBER

MS. G. PATTERSON MEMBER

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ENVIRONMENTAL ASSESSMENT BOARD
ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARING

IN THE MATTER OF the Environmental Assessment Act,
R.S.O. 1980, c. 140, as amended, and Regulations
thereunder;

AND IN THE MATTER OF an undertaking by Ontario Hydro
consisting of a program in respect of activities
associated with meeting future electricity
requirements in Ontario.

Held on the 5th Floor, 2200
Yonge Street, Toronto, Ontario,
on Wednesday, the 1st day of May,
1991, commencing at 10:00 a.m.

VOLUME 7

B E F O R E :

THE HON. MR. JUSTICE E. SAUNDERS	Chairman
DR. G. CONNELL	Member
MS. G. PATTERSON	Member

S T A F F :

MR. M. HARPUR	Board Counsel
MR. R. NUNN	Counsel/Manager, Informations Systems
MS. C. MARTIN	Administrative Coordinator
MS. G. MORRISON	Executive Coordinator

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J.C. SHEPHERD		IPPSO
R. WATSON		MUNICIPAL ELECTRIC ASSOCIATION
S. COUBAN		PROVINCIAL GOVERNMENT AGENCIES
C. MARLATT		NORTH SHORE TRIBAL COUNCIL UNION OF ONTARIO INDIANS UNITED CHIEFS AND COUNCILS OF MANITOULIN WHITEFISH RIVER FIRST NATION
D. POCH)	COALITION OF ENVIRONMENTAL
D. STARKMAN)	GROUPS
D. ARGUE)	
D. MARTIN)	
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B. ALLISON		OMAA
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J. M. RODGER		AMPCO
N. KLEER		NAN TREATY #3, et al
T. HILL		TOWN OF NEWCASTLE
R. POWER		CITY OF TORONTO & SOUTH BRUCE
M. MCGREGOR		UNION GAS LTD.

A P P E A R A N C E S
(Cont'd)

J. MONGER	CAC (ONTARIO)
C. SPOEL	VOICE OF WOMEN
F. MACKESY	ON HER OWN BEHALF
S. DIENER	
B. ANDER	
D. KUCH	
P. HAYHURST	
M. ELKHAFIF	

I N D E X o f P R O C E E D I N G S

	<u>Page No.</u>
<u>MITCHELL PIERSON ROTHMAN,</u> <u>PAUL JONATHAN BURKE,</u> <u>LILY BUJA-BIJUNAS; Resumed</u>	1149
Cross-Examination by Mr. D. Poch (Cont'd)	1150

L I S T o f E X H I B I T S

<u>No.</u>	<u>Description</u>	<u>Page No.</u>
116	"1987 Incentive Rates."	1150

1 ---Upon commencing at 10:02 a.m.

2 THE CHAIRMAN: Mr. Poch?

3 MR. D. POCH: I understand, Mr. Burke has
4 a couple of interrogatory numbers to put on the record.

5 MITCHELL PIERSON ROTHMAN,
6 PAUL JONATHAN BURKE,
7 LILY BUJA-BIJUNAS; Resumed

8 MR. BURKE: Yes. I made reference at
9 page 982, line 13, of yesterday's transcript to an
10 interrogatory response that explains why we could no
11 longer continue with modelling econometrically at a two
12 digit level for the industrial sector, and the number
13 of that interrogatory response was 1.9.41. And toward
14 the end of the discussion yesterday, there was a
15 request from Dr. Connell for an interrogatory number
16 for the interrogatory that dealt with the impact of
17 advertising on load, and that was number 1.35.3.

18 In looking at that, if you find you would
19 like additional information, we are, ourselves,
20 searching for the supporting information for that
21 interrogatory. If you could let us know, we would
22 attempt to provide that.

23 MR. D. POCH: Just so it's on the record
24 in one place, Mr. Burke. You had undertaken yesterday
25 to go back and see over what period you did.

MR. BURKE: Yes, that's not contained in

1 this interrogatory response and we are now looking for
2 the supporting material.

3 MR. D. POCH: I appreciate that.

4 CROSS-EXAMINATION BY MR. D. POCH:

5 Q. Just while we are on that, if I may.
6 The tenor of our discussion yesterday was that it
7 looked at the advertising, indeed the answer indicates
8 it looked at the advertising by Ontario Hydro, the
9 marketing by Ontario Hydro. I take it you have no
10 reason to believe that it did look at the marketing by
11 MEA members, for example?

12 MR. BURKE: A. That's correct.

13 MR. D. POCH: Mr. Chairman, I have placed
14 before the witnesses a single sheet, which we could
15 perhaps have marked as an exhibit, if it's the Board's
16 pleasure. It's entitled "1987 Incentive Rates."

17 THE CHAIRMAN: What is the next number,
18 please?

19 THE REGISTRAR: 116, Mr. Chairman.

20 THE CHAIRMAN: Do we have copies of that?

21 MR. D. POCH: Yes, I have given eight
22 copies to the clerk. I don't know if they are before
23 you or not.

24 ---EXHIBIT NO. 116: "1987 Incentive Rates."

25 THE CHAIRMAN: This comes from where?

1 MR. D. POCH: It is just a single page
2 from a multiple-page brochure published by Ontario
3 Hydro entitled "Incentive Rates," and we have simply
4 taken the first page of the explanation, rather than
5 all the rate tables, not bothering to include all the
6 rate tables. We can make full copies available, if it
7 turns out to be of interest.

8 I apologize for my marginal notes and
9 underlines. We just copied this here this morning.

10 Q. Mr. Burke or Mr. Rothman, or indeed
11 Dr. Buja-Bijunas, this is for rate, special rates, for
12 industrial customers?

13 MR. BURKE: A. Am I asked a question?

14 Q. Yes.

15 A. Yes, it seems to be.

16 Q. Now, I have underlined some sections
17 here, where it's indicated that the intention here is
18 to help industries expand or locate in Ontario or adopt
19 new, what is called energy-efficient
20 electrotechnologies, and that there are conditions that
21 this must be an incremental load of at least 3,000
22 kilowatts, and it must be measurable and so on; can't
23 displace existing load.

24 How have programs like this in the
25 industrial sector been netted out of the trend you have

1 developed?

2 A. I can only speak a little bit to this
3 matter.

4 In the early years, '87/'88, when this
5 rate structure was introduced, it is my understanding,
6 subject to check with other staff at Ontario Hydro,
7 that there was almost no take-up of this rate
8 structure, given its conditions, but I would have to
9 check that.

10 Q. All right. Perhaps you would be good
11 enough to do that for us.

12 So, I take it that there is no adjustment
13 in your load forecast methodology to take account of
14 this type of measure, and that may be because it didn't
15 have any effect, and you will let us know about that.

16 A. No.

17 Q. Now, Mr. Rothman, I am going to ask
18 you to turn with me to Exhibit 110, which is the
19 excerpts from the OEB materials.

20 Now, first of all, for the record, Mr.
21 Chairman, on page 1 of that exhibit, I had penned on
22 "OEB 1984 re '85" and that is in error. It's a 1985
23 hearing with respect to 1986 rates.

24 Mr. Rothman, you were there, you can
25 confirm that? '91 is HR20, so HR14 must have been '85.

1 MR. ROTHMAN: A. Well, I haven't gone
2 back to look up what years those were, Mr. Poch, so...

3 Q. You are content with that, you will
4 let us know if you disagree?

5 A. I will take your word for it.

6 Q. Despite my error.

7 Mr. Rothman, you were a witness in that
8 hearing?

9 A. Yes, I was.

10 Q. And at the time, I think that was the
11 period you spoke of, you were acting head of the load
12 forecast group, in the absence of someone else, in
13 addition to your economist responsibilities?

14 A. Well, if the transcript that you are
15 referring to are the pages that you have here, then
16 that was not the period when I was acting as the
17 manager of load forecasts. The manager of load
18 forecasts was Claudette MacKay-Lassonde, who was also a
19 witness in those hearings.

20 Q. But you were a witness on that panel
21 with Ms. MacKay-Lassonde?

22 A. Yes, I was. My primary
23 responsibility in that hearing was, as it is here, for
24 the economic forecast, although Ms. MacKay-Lassonde had
25 not had as long a tenure in load forecasts as has Mr.

1 Burke by now.

2 Q. So, you were a little more required
3 at the time, than you may be now in this area, to give
4 due credit to Mr. Burke.

5 All right. I would like to just read in
6 a couple of sections from the Board's report and get
7 your comments. Starting on page 4 of the exhibit,
8 which is numbered paragraph 10.9 of the OEB's report.
9 A little bit of history, the Board reads from an
10 Ontario Hydro memorandum to the Ontario Hydro Board of
11 Directors, dated February 8th, '83, that:

12 "An analysis of marketing
13 opportunities shows short-term
14 opportunities to displace oil with
15 electricity, but that market is steadily
16 disappearing. Long-term opportunities
17 are an increased utilization of
18 electricity in industry, but this
19 requires marketing-directed technical
20 innovation."

21 Then, if we turn to some of the evidence
22 in the transcript of that hearing, which follows at
23 page 9 of the exhibit, there is a transcript page No.
24 943. And we are -- I'm sorry, page 942, the preceding
25 page. This is where I took the matter up with the

1 panel, and in the middle of that page we see the
2 question -- I'm sorry, the answer from Mr. MacCarthy,
3 could you tell us who Mr. MacCarthy is?

4 A. As now, Vice-President of the Energy
5 Management Branch.

6 Q. He would have been responsible for
7 marketing at that time?

8 A. Yes.

9 Q. And he says that the focus of our
10 intention in the short-term and mid-term is likely to
11 be on increased sales, and certainly is on increased
12 sales at present time.

13 Do you have any sense of what the --

14 MR. B. CAMPBELL: Just a minute. If you
15 are going to put a quote to him, could you put the
16 complete context, please

17 MR. D. POCH: Yes, I am going to go on
18 and read the rest.

19 THE CHAIRMAN: Let me just pick it up.

20 MR. D. POCH: This is the short paragraph
21 in the middle of the page. We are going to go on and
22 read the rest. Page 942 of the transcript, page 8 of
23 our Exhibit.

24 THE CHAIRMAN: I have got it now. Thank
25 you.

1 [10:13 a.m.] So you are not quite sure what the short
2 and the midterm means in the context, and that is your
3 answer?

4 A. My guess would be that he is talking
5 in the -- well, I would have to guess that if this is
6 in 1985 or so, he is probably talking something like a
7 four- to five-year - maybe something like that -
8 period.

9 Q. Fine.

10 A. He refers to a chart, and I don't
11 know in what context he is referring to a chart, but
12 there is a reference in the preceding paragraph to a
13 chart and forecast demand.

14 Then there is a suggestion that there is
15 additional energy capacity shown on that chart. One
16 would guess that whatever the time period implied by
17 the period of excess capacity shown on that chart is
18 the period to which he is referring and we don't have
19 that context.

20 Q. Indeed, if we go on and read what the
21 intention was, we can get some better sense of it. And
22 I will read that in, so we can all follow.

23 "What we want to do is consistent with
24 what a number of other utilities are
25 doing elsewhere, is manage the demand

1 side of the equation such that it will
2 provide the maximum benefit to the
3 customer and to Ontario Hydro.

4 "By focusing on additional sales,
5 increasing them in the short term, then
6 focusing on the load management activity,
7 the strategic conservation activity in
8 the longer term, then we can increase
9 sales in the short term without advancing
10 in-service dates of committed generation
11 in the long term, and thereby having
12 lower increases in the short term and no
13 greater increases in the long term."

14 I suppose by 'increases' he is talking
15 about rates there?

16 A. Yes.

17 Q. So, our focus is on -- the short term
18 is on additional sales. He talks about wanting to
19 maintain a presence in terms of conservation.

20 A. And about previous conservation
21 efforts.

22 Q. Yes. And the Board asks what the
23 phrase, sort of "buy more, but waste less" and Mr.
24 MacCarthy replies, "wise and wider use," which was, I
25 guess, one of the slogans of the day; is that right,

1 Mr. Rothman?

2 A. I --

3 Q. And --

4 THE CHAIRMAN: Is that a question?

5 MR. D. POCH: Yes.

6 Q. Go ahead, Mr. Rothman. Do you recall
7 that phrase, "wise and wider use"?

8 MR. ROTHMAN: A. Yes. I don't know that
9 I would call it a slogan of the day, but ...

10 Q. Okay. I didn't think that was such
11 a --

12 A. It existed.

13 Q. All right. And if we go on and at
14 the bottom of 943, the response is:

15 "We are working on demand management
16 right now, Mr. Poch, in terms of focusing
17 on the increased sale."

18 So, Mr. Rothman, just so we have the
19 context, in the '80s, the corporate plan was to focus
20 on increased sales, and they do mention there was
21 conservation as well, and keep the conservation
22 capability in place, but focus on increased sales to
23 soak up, if you will, excess capacity; and the idea was
24 to back down from that in time, and, indeed, market
25 conservation in time so that it wouldn't require an

1 advanced date for any generation.

2 Is that a fair description of your
3 understanding of what the corporate strategy was?

4 A. In the mid-1980s, many North American
5 utilities, as Mr. MacCarthy suggests in this
6 transcript, had the problem of what looked like an
7 excess capacity in the short run, but a potential
8 shortfall of capacity in the longer run.

9 And many of them saw that circumstance as
10 an opportunity to adopt some demand management program
11 that would help solve that problem.

12 The problem for electrical generation
13 utilities like Hydro is that we do average cost
14 pricing. When you are doing average cost pricing, if
15 you are operating at below the capacity of the existing
16 system, any increase in sales reduces average cost,
17 because it produces sales at a marginal cost below the
18 current average cost and, therefore, reduces the
19 average cost and, therefore, price, given that you are
20 doing average cost pricing.

21 However, once you reach capacity, further
22 sales increase average costs, because they foresee to
23 go to higher cost capacity to operate.

24 So, it argues as Mr. MacCarthy does, for
25 some focus on the demand side to try to keep the system

1 operating as close as possible to its capacity level.

2 And that is exactly what Ontario Hydro, along with many
3 other utilities in North America at the time, were
4 trying to do.

5 Q. Right. And to paraphrase then, you
6 were trying to either market electricity or market
7 conservation so that the load matched the capacity as
8 best you could make it, and that would result in the
9 lowest unit price for electricity?

10 A. Given that over the medium term,
11 capacity is fixed; and even in the longer term -
12 viewing the longer term as, say, ten years from 1985 -
13 the capacity wasn't fixed, but what the capacity would
14 be was fixed, in the sense that it wasn't likely to be
15 larger than the capacity of the existing system, plus
16 that of those plants, then either are under
17 construction, or well into advanced planning stages.

18 Q. All right. Now, Mr. Rothman, I went
19 on to discuss this with you later in that hearing
20 record. Can you turn to page 10 of this exhibit, which
21 is transcript page 1204 from the HR14 proceeding.

22 You see there it is entitled, "Answers by
23 Mr. Rothman". I don't know if this was -- I think this
24 was cross-examination by Mr. Howe, not by myself.

25 THE CHAIRMAN: I am sorry, the page, Mr.

1 Poch?

2 MR. D. POCH: Page 10 of the package,
3 sir, which is transcript page, actually page 1204 of
4 that transcript.

5 THE CHAIRMAN: Thank you.

6 MR. D. POCH: Q. Now, you see the
7 question there about a third of the way down the page?

8
9 "Mr. Rothman, would you agree that
10 focusing on sales promotion in the 1990s
11 will lead to the installation of capital
12 equipment by customers in the 1980s?"
13 First of all, Mr. Rothman, will you agree
14 with me that -- it is probably a typo there and it
15 probably should be "promotion in 1980s" to make any
16 sense?

17 MR. ROTHMAN: A. Yes.

18 Q. All right. And you answered, "yes."
19 And then the question is about the
20 longevity of that capital equipment:

21 "And would it raise those loads over
22 the longer haul?"

23 And your answer is:

24 "Depends on the lifetime of the
25 capital equipment."

1 Quite logically.

2 A. And it also would depend on the kinds
3 of matters that we spoke of yesterday in talking about
4 the impact of marketing programs--

5 Q. That's right.

6 A. --as to whether the impact of the
7 marketing program was simply to draw forward a capital
8 investment decision that would have been made later.

9 Q. Yes. And the final question and
10 answer is:

11 "Would you expect that, in fact, there
12 would be some raise in the loads?"

13 And you say:

14 "There may be some basis in which some
15 of the capital equipment installed would
16 continue to be in place and would be used
17 beyond 1990 or some timeframe."

18 A. Yes, and I notice that in that
19 answer, I didn't make the additional comment that I
20 just did.

21 Q. Yes. Okay. We will take your
22 additional comment as well.

23 Mr. Rothman, electric baseboard heating,
24 which we saw being marketed in the "stamp out cold feet
25 with electric heat" promotion in the mid-'80s, what is

1 the -- actually, Dr. Buja-Bijunas, you could perhaps
2 help us here. What is the expected lifetime of
3 electric baseboard heating?

4 DR. BUJA-BIJUNAS: A. I don't have that
5 figure with me. I presume it is around 15 years or so,
6 but I would look it up.

7 Q. Okay. And again, your experience is,
8 once people are on a particular furnace or heating
9 system, they tend to stay on that fuel?

10 A. There is that tendency.

11 Q. All right. Now, Mr. Rothman, I would
12 ask you to go with me - later on in this package,
13 Exhibit 110 - to excerpts from the Ontario Energy
14 Board's HR16 Report. They begin on page 13 of this
15 exhibit.

16 Now, I have calculated that HR16 took
17 place in the summer of 1987 and was with respect to
18 rates and spending plans of Ontario Hydro for 1988.

19

20

21

22

23

24

...

25

1 [10:34 a.m.] And I'd like to get your comments on a
2 few sections in this report as well. Start at page 18
3 of the exhibit.

4 The Board observes in the middle of that
5 page as follows:

6 "The Board is not alone in
7 recommending the timely and early
8 implementation of strategic conservation
9 programs."

10 Pausing there, Mr. Rothman, the phrase
11 "strategic conservation," that implies conservation
12 that's comes about by reason of the utilites'
13 activities as opposed to natural conservation, is that
14 correct?

15 MR. ROTHMAN: A. I think that was the
16 terminology in use at the time.

17 Q. And that would be comparable to the
18 phrase "induced" that you are using now? Mr. Burke,
19 you are nodding yes?

20 MR. BURKE: A. Yes, it is comparable.

21 Q. And the quote continues:

22 "For over a decade, a number of
23 committees and commissions that have
24 investigated Hydro's activities have
25 recommended repeatedly the early

1 implementation of such programs. The
2 Select Committee on Hydro Affairs in
3 1976, the Royal Commission on Electric
4 Power Planning or CEPP in 1980..."

5 Again pausing there, we refer to that as
6 the Porter Commission? Is that right?

7 A. Yes.

8 Q. "...the Select Committee on Energy in
9 1986 have all pointed out the necessity
10 and prudence of implementing strategic
11 conservation."

12 And then there is a report of the
13 position of special counsel. Special counsel at the
14 OEB is counsel representing Board staff, can you
15 confirm that for us?

16 MR. B. CAMPBELL: It may not have been at
17 that time.

18 MR. D. POCH: Or it may have been
19 representing -- the point is he was retained by the
20 Board, as opposed to representing some other party.
21 Let's leave it at that. This was Mr. Broderick
22 McAuley's innovation.

23 MR. B. CAMPBELL: Mr. Chairman, I wonder
24 if I could just ask where all this is leading. These
25 witnesses are not from the energy management branch.

1 We do have, in Panel 4, witnesses from the energy
2 management branch who are familiar with the history of
3 both programs and the development of the kinds of
4 energy efficiency activities that are discussed in this
5 section of the Board report.

6 This is not a section of the Board's
7 evidence that anyone on this panel, or evidence before
8 the OEB, that anyone on this panel is responsible for.
9 And certainly, in terms of operation of programs and so
10 on, which is what this section of the Board report is
11 aimed at, and the speed with which programs are being
12 implemented, these are certainly not the witnesses who
13 have any responsibilities in that area. We do have
14 witnesses coming up who do.

15 I wonder if those questions in this area
16 shouldn't be deferred to those people? I'm not sure
17 where it is going.

18 MR. D. POCH: Mr. Chairman, I can
19 certainly agree that I will try not to get into
20 questions about the effectiveness of these programs and
21 so on. I'm trying, and I'm leading to questions on the
22 way some of these concerns have or have not been taken
23 into account in the load forecasting methodology. I
24 will try to tie my questions to that, but it is
25 necessary to set the stage a bit here by going through

1 this and putting forward at least one official record
2 of what that history was, before posing questions to
3 these witnesses as to how they dealt with that history.

4 THE CHAIRMAN: Well, I certainly agree
5 that the way in which programs are used to -- in the
6 forecasting technique is quite relevant. I'm not sure
7 a little bit why we have to go through all this story
8 to get to those kinds of questions, but perhaps you
9 will be getting to it fairly soon.

10 MR. D. POCH: Yes, I will try to do that,
11 sir.

12 Q. Now, Mr. Rothman, I'll leave
13 special -- in that light, I'll leave special counsels'
14 concerns aside, and AMPCO's concerns aside, and Hydro's
15 defence aside, in fairness to AMPCO and special
16 counsel, and just go to the Board's conclusion in this
17 little section at page 20 of our exhibit. And this was
18 in 1987, and the Ontario Energy Board observed:

19 "The external evidence..."

20 MR. B. CAMPBELL: Mr. Chairman, this is
21 exactly the kind of problem we have. We have the
22 conclusion of another board that is being put on the
23 record here. We have no one here who can speak to
24 whether this conclusion, in the view of Ontario Hydro,
25 was justified, who can speak to the evidence here or

1 who can deal with it in any way. And we do have people
2 who can perhaps deal with some of these matters on a
3 later panel.

4 In my submission, it is quite unfair to
5 holus bolus, be really reading in these conclusions to
6 people who have no capability of dealing with them in a
7 comprehensive way. And I think we have gone far beyond
8 setting any stage for questions as to the preparation
9 of the load forecast, when we are getting into this
10 kind of thing. I think it is quite unfair to these
11 witnesses and to Ontario Hydro.

12 MR. D. POCH: Mr. Chairman, these
13 witnesses have stated on the record yesterday that
14 there has not been a net load building effect in the
15 '80s. That is what I took the tone of their replies to
16 be. I think I'm entitled to challenge that position,
17 and therefore whether or not they have adequately
18 considered...

19 MR. BURKE: I did not say that yesterday.

20 THE CHAIRMAN: Hold it just a minute. As
21 I understand it, Mr. Campbell's concern is that a
22 number of conclusions and views and theories or one or
23 the other are being put on the record here without --
24 and may be treated, in some sense, as evidence.

25 I wouldn't have thought so. I would have

1 thought that this is simply giving foundation for what
2 the questions you want to ask, but I do think you ought
3 to be getting to the questions that these people are
4 responsible for, and that is, the extent to which
5 Hydro's programs and other activities are taking into
6 account the load forecast.

7 MR. D. POCH: I'll try do that, sir.

8 Mr. Chairman, I might just put on the
9 record then that I trust when Ontario Hydro seeks to
10 rely on reports of other inquiries, such as the Hare
11 Commission or the Ontario Nuclear Costing Inquiry, they
12 will be held to the same requirements. Thank you.

13 MR. B. CAMPBELL: Mr. Chairman, I don't
14 know what the heck that is all about. If Ontario Hydro
15 is presenting witnesses who participated in another
16 inquiry, and want to rely on the results of that, then
17 there will be witnesses here who can speak precisely to
18 the results of that inquiry and their responsibilities
19 in that regard.

20 My point here is that, with respect to
21 the conclusions that are sort of flowing onto the
22 transcript, these people are in no position to speak to
23 them at all, in terms of, you know, for instance, on
24 page 20, that kind of thing. These witnesses can't
25 speak to it.

1 I have no objections to questions about
2 what was taken into account or not taken into account
3 in the load forecast. I hope I have made that clear.

4 THE CHAIRMAN: I think we will proceed
5 with that now. And if we can get to that issue, that
6 would be helpful.

7 MR. D. POCH: All right.

8 Q. Mr. Burke, you have said to us the
9 kinds of marketing programs that are being discussed
10 there, you haven't been able to come to any statistical
11 conclusions about the impact of them?

12 MR. BURKE: A. Yes, I think that is what
13 we were talking about yesterday. We didn't deny the
14 programs existed. We said that we were not able to
15 measure the impact of them. And therefore, we were not
16 able to roll any impact of them into our considerations
17 of the load factor.

18 MR. ROTHMAN: A. And I think we also
19 said that even in an a priori consideration, without
20 being able to do the formal statistical work, there was
21 no a priori direction that one might infer about the
22 impact that those programs might have on the historical
23 data base that was used for the load forecast.

24 Q. But you have agreed that you haven't
25 looked at the marketing, the broader marketing effort,

1 including such things as the spending of all those
2 programs we looked at yesterday in the MEA and so on.
3 And so, can we agree that you really can't know if its
4 had a big impact or not from the work you have done?

5 MR. BURKE: A. Yes, I think most of the
6 programs we have talked about are advertising programs.
7 In rare cases are they anything that one could suggest
8 changed the financial incentives available to people to
9 adopt certain technologies. I think it is quite well
10 known that estimating the impact of advertising
11 programs for any industry whatsoever is notoriously
12 difficult to do, and we have not been able to do it.

13 Q. All right. Dr. Buja-Bijunas, you
14 have noted, and you have, too, Mr. Burke, that there is
15 not a great cross price electricity between gas and
16 electric. And you have said, I believe, tell me if I
17 have got it right, that you therefore believe there are
18 a number of non-price factors which are influencing,
19 dominating, that choice?

20 A. Well, I think what we said was the
21 net for the whole system, that is residential,
22 commercial, industrial, was very negligible, but we
23 acknowledged that there was a cross price elasticity in
24 the residential sector, and that even though it was
25 small - I think this goes back to one of the early days

1 of the hearing - even though it was small, the fact is
2 that only a portion of the load in the residential
3 sector is sensitive to interfuel competition. That is
4 the space and water heating component primarily. So
5 that the elasticity that is implied for that component
6 is not that small.

7 But we have also said you are correct
8 that, to explain the change in market share of electric
9 space heating, non-price factors are part of what seems
10 to be influencing the choice.

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1 [10:35 a.m.] Q. Indeed, Hydro has had a long history
2 of interaction with its customers, not just in the
3 advertising media, but you do consultations and
4 continue to do consultations with customers, you have
5 various client service mechanism, as do the municipals.
6 So it would be a very difficult thing to study, I can
7 grant you that. Do you agree with all that?

8 A. I think I have agreed quite often
9 that it's a difficult thing to study.

10 Q. Now, just to get a sense of where it
11 has been quantified, in our little survey of Ontario
12 Hydro news, we came upon one place where it was
13 quantified somewhat, and that's at page 78 of Exhibit
14 108, and --

15 A. Excuse me, is that the '40s, '50s and
16 '60s one?

17 Q. Yes, it is, and this is January '62,
18 so this is fairly early on. Right at the beginning of
19 your period that you use for regression.

20 Now, we just lifted out of this report
21 the programs mentioned, which were said to be
22 incremental. There was the home freezers, where they
23 talk about load beyond anticipated normal sales;
24 electric dryer campaign, which was augmented with a
25 handout of free electric blankets, which further

1 increased load; commercial/industrial electric heating
2 installations; there was a wiring time payment plan,
3 but there was nothing quantified there, and so on.
4 Anyway, we took what was quantified, and at page 12 of
5 Exhibit 107, we just added it up. And --

6 MR. B. CAMPBELL: These are all from page
7 what?

8 MR. POCH: 78, of Exhibit 108.

9 Q. Now, Mr. Burke, I appreciate you
10 can't confirm any of these numbers; this was before
11 your time. But we added it up, and it seemed to
12 account for about 25 per cent of the increase in load
13 that year, just the ones where they say -- that are
14 mentioned there. Do you think that kind of impact is
15 plausible? Is that in the range that wouldn't shock
16 you?

17 A. I really can't say. I have to look
18 at this a lot more closely to know whether people
19 were -- because this is Ontario Hydro news, and people
20 wanted to feel good about what they were doing, they
21 were giving themselves credit for a lot more than they
22 were actually achieving. I really can't assess.

23 Q. Perhaps that's a good question. We
24 can come back with Panel 4 then.

25 A. Sure.

1 Q. Now, in OEB materials, Exhibit 110,
2 the first report, the HR14 Report, page 5 of that
3 exhibit, paragraph 10.15 of the OEB's report, reads as
4 follows:

5 "Hydro has set a goal for itself to
6 increase its current share in the market
7 from 16 per cent to 20 per cent by 1990.
8 That goal makes it clear that Hydro
9 intends to expand by capturing market
10 share from other energy competitors in
11 Ontario."

12 This was in '85. What was your market
13 share by 1990?

14 A. That is a very interesting goal,
15 because I believe that --

16 THE CHAIRMAN: No, no, he asked what your
17 market share was in 1990.

18 MR. D. POCH: Thank you, Mr. Chairman.

19 MR. BURKE: Do we know exactly?

20 DR. BUJA-BIJUNAS: Do you mean space
21 heating market share, or what are you referring to?

22 MR. D. POCH: Q. No. I think this is
23 market share of the --

24 MR. BURKE: A. I think it is of the
25 non-transportation energy market.

1 Q. That's right.

2 A. Let me see if I can find what, in
3 fact, it is today. I have to admit, I don't have that
4 number with me. I have the shares in each market.

5 Q. Can you get us that number, and can
6 you, just for the sake of discussion, confirm that you
7 are getting close to that number now, if you have not
8 already exceeded it?

9 A. What I was about to observe was that
10 we actually got to 19 per cent the next year and it had
11 nothing to do with increasing the electricity's market
12 at all. It was because the other markets contracted,
13 so that the goal was a somewhat -- actually, as it's
14 stated here, achieving the goal didn't necessarily
15 depend on Ontario Hydro doing anything.

16 Q. What has happened to the market load
17 since then, market share since then?

18 A. My sense is that it's gone down
19 slightly, but I would have to check the numbers.

20 Q. Would you get us those numbers,
21 please?

22 And then in the HR15 material, there is
23 just one exhibit from HR15, at page 12 of this package.
24 This is a 1986 document referring to 1987 electricity
25 rates.

1 THE CHAIRMAN: It's not my page 12. My
2 page 12 is Interrogatory 3.4.8.

3 MR. D. POCH: Yes, that's what I am
4 looking at. That's an interrogatory in the OEB HR15
5 hearing. Unfortunately, the Xerox is of particularly
6 poor quality.

7 Q. Now, Mr. Burke, this is an
8 interrogatory that was posed by the Board itself to
9 Ontario Hydro, and I think it speaks for itself. It
10 simply says that marketing programs, those that have
11 load targets associated with them for '86 and '87, have
12 440 megawatts and 450 megawatts respectively. And then
13 it goes on to note that there are other programs that
14 might decrease load, and that these would not
15 necessarily be coincident with system peak; presumably,
16 they would have a certain load factor.

17 This is, it seems to me, a fairly
18 significant chunk of electricity. Where have these
19 kinds of quantified numbers been taken into account in
20 your load forecast?

21 MR. BURKE: A. These are targets. I
22 don't think anybody is claiming here that that was the
23 net saving that was achieved. I think I have to look
24 at it more carefully, but it looks to me like --

25 THE CHAIRMAN: Please, let Mr. Burke

1 finish.

2 MR. D. POCH: Q. Go ahead, Mr. Burke.

3 MR. BURKE: A. A target is something you
4 are aiming towards.

5 I think the issue was whether it had ever
6 been -- after the fact, whether it had ever been
7 adequately demonstrated that these targets were
8 achieved.

9 Q. Have you looked at that and come to
10 your best estimate of what was achieved of those
11 targets?

12 A. I think at the time we concluded that
13 the safest things to do was not to change, not to take
14 any of the effects into account. But that was because,
15 I think, the evaluation procedure was not as
16 comprehensive as the evaluation procedure we are
17 establishing for the efficiency improvement programs
18 that we have today.

19 Q. All right. So what you have said to
20 me is you didn't feel comfortable trying to evaluate
21 that?

22 A. I believe that the degree of success
23 in achieving targets was not demonstrated to the extent
24 that we felt comfortable using those numbers in our
25 forecast.

1 Q. So you have set the number in your
2 forecast. There is no adjustment in your forecast; you
3 have assumed then the impact was zero?

4 A. Effectively, we did our analysis,
5 assuming that the observed load data was--

6 Q. Unaffected?

7 A. --unaffected by these programs.

8 Q. Thank you. Just to sum up the points
9 we have captured so far, and let's make sure we agree
10 this far. We started off, we talked about how
11 forecasting projects trend in relationships into the
12 future and you modify them with judgment. And you try
13 not to make choices. That's how you see your role.

14 You try not to make policy decisions
15 about those things that might effect load yourself.

16 MR. B. CAMPBELL: With respect, I think
17 the witnesses have said exactly the opposite. That is,
18 one thing they do in one method --

19 THE CHAIRMAN: If the witness disagrees,
20 perhaps he can say so.

21 MR. B. CAMPBELL: Mr. Chairman, I think
22 if Mr. Poch is going to try and summarize it, I
23 think --

24 MR. D. POCH: I am putting it to the
25 witness.

1 THE CHAIRMAN: It's a very dangerous
2 thing to do, to try to summarize it. But if he
3 summarizes and the witness doesn't agree, the witness
4 can say to the extent he doesn't agree, if he doesn't
5 agree at all, or to what respect he does.

6 MR. B. CAMPBELL: I agree he can, Mr.
7 Chairman. I think, though, that where the question has
8 been asked several times that we are getting into areas
9 where we are just reploughing ground. I mean, these
10 witnesses have said that in one type of modelling,
11 certain things are done, and in others --

12 THE CHAIRMAN: I understand.

13 MR. B. CAMPBELL: We have covered the
14 ground several times.

15 THE CHAIRMAN: I understand you, Mr.
16 Campbell. Thank you.

17 Now, Mr. Poch, it's not a very useful
18 exercise to try and paraphrase a whole series of
19 questions down into one sentence, because you get
20 yourself into real trouble doing that.

21 MR. D. POCH: I can see it would take
22 more time than it certainly warrants, Mr. Chairman, I
23 agree.

24 Q. Just, then, in how you handle this,
25 Mr. Burke, there are a number of choices to be made,

1 such as government policies choices, and such as rate
2 structures and pricing, which you consider to be
3 impacts in the basic on, for example, if they are
4 naturally- or externally-driven, so they are not in the
5 DSM number.

6 First of all, have I got that right?

7 MR. BURKE: A. Well, the question isn't
8 overly clear to me, exactly. Could you rephrase it?

9 Q. Government choices in the future to
10 extend regulations to do something about electric
11 heating, what have you, beyond the five regulations you
12 have mentioned, they would be effects upon the basic
13 forecast; we are not going to discuss them later in the
14 DSM discussion, is that right?

15 A. That is correct. That is, the
16 electrical efficiency improvement portion and the load
17 shifting portion refer to things that Ontario Hydro
18 itself does. And if there is another category, which I
19 think you have identified as what the government could
20 do by way of policy changes in future, which could
21 affect our business, and to the extent that they are
22 not reflected in our documentation of the 1990 load
23 forecast, then they are not in there.

24 Q. All right. I wanted to make that
25 clear.

1 And to the extent that Ontario Hydro can
2 influence load, through marketing, non-incentive
3 marketing, the non-incentive type marketing is in the
4 basic, is it? The one exception you have made is when
5 you do customer-specific audits. Have I got that
6 right?

7 A. Well, I think I phrased it somewhat
8 more generally. That is, customized information of
9 value, which causes decisions to be made that would not
10 otherwise have occurred, that is, the basic load
11 forecast is attempting to capture those decisions which
12 would normally occur under the evolution of the current
13 market for electricity and energy in the province.

14 If a consulting study is done which
15 provides advice to the manager of a particular
16 commercial building or something like that, and that
17 causes that person to make some choices of a lighting
18 system, that they wouldn't otherwise have made, then we
19 are calling something to do with electrical efficiency
20 improvement. And it is captured in that portion of the
21 primary end of the load forecast, not the basic. It
22 doesn't have to be just --

23 Q. Okay. It's not --

24 THE CHAIRMAN: Let him finish, please.

25 MR. BURKE: It doesn't have to be an

audit. It can be a study, whatever piece of information or, in fact, costs incurred by Hydro; whatever way that causes people to make decisions they wouldn't otherwise have made. It may be that an incentive is offered not to the customer directly, but it's offered to the people that sell things to customers.

Whatever it is that causes a decision that would not otherwise reasonably have been expected to occur, that we are including in the electrical efficiency improvement portion.

MR. D. POCH: Q. And, obviously, historically, there was a different categorization?

MR. BURKE: A. That's right. I described in my direct evidence the transition between 1988 and 1990 of the treatment of information programs on this topic.

MR. ROTHMAN: A. Is that the question that you are asking? Different characterization of the way information programs were treated or a different characterization of the way incentive programs in general are treated?

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1 [10:50 a.m.] Q. Well, I was dealing with the former.

2 A. Okay, fine.

3 Q. But indeed, just to clarify the
4 record then, in terms of incentive programs, my
5 understanding is, you started to capture them
6 separately as of '83?

7 MR. BURKE: A. No, I don't believe so.

8 Q. When did you start to capture them
9 separately and not --

10 A. Incentive-driven demand management
11 programs were included in the forecast, I believe, for
12 the first time in 1987. And there were none in place,
13 though. I think the first impacts were slated for '89
14 or so, at the time.

15 Q. Okay. So, up until '89, the basic
16 caught all this, and embedded in the basic was whatever
17 work Hydro did. And now your intention is to try to
18 segregate these impacts?

19 A. Which impacts now?

20 Q. The ones caused by Hydro.

21 A. You mean, the difference between the
22 two kinds of information programs?

23 Q. No, any of Hydro's activities where
24 you spend money, as you have said.

25 A. Okay.

1 Q. Is there anything left in the basic?

2 A. Yes. The broadly based advertising
3 programs, which -- yes.

4 Q. Okay. Thank you.

5 Let's go on to look at some more specific
6 assumptions and ethnological issues related to the GDP,
7 the sort of human activity box of our earlier slide.

8 I just want to get some comments and
9 documents reconciled, if I may. Exhibit 1.7.35, which
10 is an interrogatory in the bundle we have provided...

11 A. I have that, if you want to talk to
12 me about it.

13 Q. This document shows the changes in
14 various components of the load forecasts in '88, '89
15 and '90. And I am looking at electricity prices, which
16 is at the bottom of the first page.

17 You have mentioned a 24 per cent figure
18 for what has happened to electricity prices since '88.
19 Is that basically the summation of the two per cent
20 change figures for the year 2010; that is, 4.9 per cent
21 plus 19.7 per cent?

22 A. It seems okay to me.

23 Q. All right. Now, in the transcript,
24 at page 715, line 9, you said, if I have understood it
25 correctly --

1 THE CHAIRMAN: Mr. Poch, which
2 transcript, please?

3 MR. D. POCH: Transcript of these
4 proceedings at page 715, line 9. I don't think we need
5 to turn it up.

6 Q. I took from it that you were saying
7 that the 1990 load forecast is based upon a slight
8 decline in price. So, these numbers here, the 24 per
9 cent, is the change in the year 2010?

10 THE CHAIRMAN: I must be having some
11 problems. I can't see 24 per cent. Is it there
12 somewhere?

13 MR. D. POCH: Q. The 24 per cent - and I
14 think Mr. Burke agreed that -- Mr. Burke, do we have
15 this right, it is an approximation?

16 THE CHAIRMAN: Are we looking at document
17 1.7.35?

18 MR. D. POCH: Yes, we are.

19 THE CHAIRMAN: Where does it say 24 per
20 cent?

21 MR. D. POCH: Q. Mr. Burke, perhaps you
22 could explain again.

23 MR. BURKE: A. Well, I think for the
24 line at the very bottom of the page for the year 2010,
25 there is a per cent change, from 1988 to 1989, of 4.9

1 per cent.

2 THE CHAIRMAN: Well, it is not in there,
3 though. It is not written there.

4 MR. BURKE: No, the number 24 is not
5 there.

6 And then, the change between 1990 and
7 1989 is an additional 19.7 per cent. And it is the sum
8 of these two, which, while it looks to be closer to 25
9 per cent, probably reconciles with the 24 per cent
10 number that may have been mentioned at other points.

11 MR. D. POCH: Q. All right. And just so
12 we all make sure we understand, this is the change --
13 if we were just looking at the price forecast for the
14 year 2010 in each of those forecasts. And it is the
15 change in the 2010 number, how that 2010 number has
16 changed, forecast to forecast.

17 So, your best estimate for the year 2010
18 has fallen 24 per cent, roughly?

19 MR. BURKE: A. No. It has increased.

20 Q. I am sorry, increased 24 per cent,
21 roughly, from the estimate you made underlying the
22 balance of power plan?

23 A. I would just like to add one little
24 thing here, that this residential retail does include
25 the effect of the GST.

1 Q. Okay, I assumed so. But my
2 understanding is correct?

3 A. Yes.

4 Q. Now, at page 715 of the transcript,
5 at line 9 - I will just read it, so you don't have to
6 turn it up - this was discussing prices and who makes
7 prices, and what you accept.

8 Mr. Rothman answered:

9 "There were years when we rejected the
10 forecast of falling prices"

11 And that is the forecast provided by the
12 other departments in the organization.

13 "There was a year, and Mr. Burke tells
14 me it was this year, in which we accepted
15 a forecast of a slight decline in real
16 prices and used that for the load
17 forecast."

18 A. That refers, not to 1990, but it
19 refers back to the forecast that was submitted for the
20 DSP, 1988. That is, in 1988, the forecast that is in
21 the DSP has a slight real decline. And effectively, we
22 are saying, that was high enough for us not to quibble
23 over the difference with the people who forecasted
24 prices.

25 Q. And with the roughly 24 per cent

1 adjustment you have made for the year 2010, in the path
2 of electricity prices, I take it there would be an
3 increase in the real price now forecast?

4 A. Well, certainly if we were going down
5 over 20 years at .2 per cent, effectively, the 1988
6 real price in 2010 -- actually, it is given right here
7 on that page -- no, I guess you would have to know what
8 the 1990 value was.

9 But essentially, yes, there was about a
10 four per cent real reduction in rates associated with
11 the projection in 1988. And we are now at about plus
12 20 per cent.

13 Q. All right. So in other words, if we
14 take the roughly 24 per cent change, deduct the four
15 per cent that you were assuming was going to be the
16 fall, and we are left with a net, roughly 20 per cent,
17 increase in the real price of electricity now being
18 forecast?

19 A. That's correct.

20 Q. Okay. And it is that number that we
21 can apply the minus .42 elasticity to?

22 A. Yes, and that would give you the
23 long-run price effect, nothing else changing, and not
24 necessarily by 2010, because not all of the price
25 impact occurs by 2010.

1 Q. Okay. So, we would just multiply
2 those two numbers, and we would expect to see a roughly
3 eight per cent decline, all else being an equal, in the
4 long run, because of that price change?

5 A. In the long run, that's correct, yes.

6 Q. But, in fact, the difference between
7 your best estimate today, and the estimate underlying
8 the balance of power, if we want to see the difference,
9 we would have to apply that .42 to the full 24 per cent
10 number, would we not?

11 A. Yes, that's correct.

12 Q. Okay.

13 A. But I think at various points, we
14 have pointed out that various things - including in
15 this response - that various things change, so you can
16 only infer the partial result from the elasticity.

17 Q. Okay. Now, what price is assumed -
18 and if you can't answer it, just, please, say you
19 can't - what price is assumed in the balance of power
20 plan?

21 Well, you have already told us what is
22 assumed for the load forecast. That was the slight
23 decline in price. Was that the price forecast that was
24 used by the other parts of the corporation in
25 developing the balance of power plan?

1 A. Well, I don't know who else in the
2 corporation would have -- all I know is that in the
3 load forecast, in the -- the 1988 basic load forecast
4 was used for the balance of power plan. And we used
5 the official price projection that year, and I will
6 presume everybody else used the official price
7 projection, but I don't know.

8 Q. Okay. And just so we are clear here,
9 there would be a price projection used that would --
10 would a price projection be part of the avoided cost
11 formula, do you know? If you don't know, let's leave
12 it.

13 A. I better not say.

14 Q. Okay. The DSM potential, that
15 long-term after five years out, that is something that
16 your group forecasts as opposed to the energy
17 management group?

18 A. The potential?

19 Q. Yes.

20 A. As opposed to what we actually expect
21 to attain?

22 Q. Well, you tell me what you forecast.

23 A. Well, we are responsible for working
24 with energy management and system planning to develop
25 the estimate of potential beyond the period of time

1 covered by the five-year plan of the energy management
2 branch.

3 MR. ROTHMAN: A. To be a little more
4 specific, and, perhaps unwisely, to let Mr. Burke off
5 the hook on this one and to put me on, the division is
6 responsible for that, but Mr. Burke's department is
7 not--

8 Q. Okay.

9 A. --though he works with the unit that
10 does.

11 Q. All right. You supervise the group
12 that both works with energy management to develop those
13 long-term potential figures?

14 A. Yes.

15 Q. Now, the target figure that we have
16 spoken of - in terms of the EEI, it is 2,000 megawatts
17 for the year 2000 - is that a number that your group
18 sets?

19 A. No.

20 Q. Okay. Where does that number come
21 from?

22 MR. BURKE: A. Well, I think what we can
23 speak to, or what I can speak to, is the fact that in
24 the primary load forecast, we have a forecast that we
25 will achieve 2,000 megawatts.

1 Q. All right. Is that your forecast?

2 A. It is my forecast, considering the
3 information I get from this interbranch process.

4 Q. Now, Mr. Burke, you will be back on
5 Panel 4 so we can discuss the appropriateness of that
6 number.

7 I don't propose to go into it now, except
8 to link it to what we are discussing here, the
9 electricity price forecast.

10 Which electricity price forecast were you
11 using when you made your judgment about that target of
12 2,000 being attainable?

13 A. Each year, we have reassessed the
14 potential and the attainable. And, for instance, in
15 the 1990 load forecast, we still have a forecast of
16 2,000 megawatts in the year 2000. And so, certainly it
17 is consistent to the extent that price matters with the
18 current price projection.

19 Q. Mr. Burke, since '88, you have told
20 us the electricity price -- your view of what is going
21 to happen to prices has changed in a direction which
22 would, if anything, tend to reduce load, I take it.

23 And has the estimate of the potential for
24 DSM changed? My understanding from the evidence is
25 that it has gone up.

1 A. Yes.

2 Q. All right. And so, if I understand
3 your evidence, despite those two changes, the target of
4 attainable for the year 2000 has not changed --

5 MR. B. CAMPBELL: Well, just a minute.
6 We really are getting right into Panel 4 here. This is
7 the quantity, the amount of the target, the rationale
8 for it moving one way or another. This is a target
9 amount. That is precisely what Panel 4 is going to
10 deal with.

11 MR. D. POCH: All right. I will withdraw
12 that question just to speed things along.

13 Q. And Mr. Burke, despite those two
14 factors, your estimate for natural conservation, have
15 you adjusted that to take into account - that is, up in
16 the basic - have you adjusted that to take into account
17 these two factors?

18 MR. BURKE: A. Well, I think, certainly,
19 the estimate of natural conservation is not a function
20 of the potential for induced conservation. So that is
21 not an issue at all in this.

22 Q. Okay.

23 A. And we derive the estimate of natural
24 conservation from the basic by doing some sort of
25 frozen efficiency-type projections, and, frankly --

1 well, maybe I should finish my sentence.

2 THE CHAIRMAN: Especially if you are
3 going to be frank. (Laughter)

4 MR. BURKE: Dr. Buja-Bijunas will tell
5 you exactly where we stand as to a 1990 estimate of
6 this quantity.

7 I should just say, it is derived from the
8 basic and, therefore, something that we have to do
9 after we finalize the basic load forecast. It is not
10 something that goes into the basic load forecast.

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1 [11:05 a.m.] DR. BUJA-BIJUNAS: That is correct. As
2 far as driving the frozen efficiency numbers, we
3 haven't completed them for 1990. We are sort of
4 partially through doing it for residential/commercial
5 sector.

6 But as far as consistency between the
7 work ongoing for the DSM estimation, and the efficiency
8 assumptions underlying the basic forecast, what we
9 provide to the analysts doing the DSM analysis is the
10 end-use forecast, which gives all the efficiency
11 assumptions, et cetera.

12 So, we may not have that frozen
13 efficiency number at the end, but all the assumptions
14 underlying the basic are fed to the DSM analysts, who
15 incorporate those assumptions into their analysis. So
16 that information has gone from one group to the other.

17 MR. D. POCH: Q. It seems to me what you
18 have just said is you put them in a position to adjust
19 their goals or targets, what have you, to the basic--

20 DR. BUJA-BIJUNAS: A. Oh, no, no no.

21 Q. --but I'm trying to look at it the
22 other way.

23 A. They do not, no. What I'm getting
24 at, in fact, to the extent that we have, within the
25 basic, a certain efficiency improvement, we want to

1 make sure that they are not counting the same thing.
2 We want to ensure consistency between both sets of
3 numbers. And so we relay that information to them.

4 Q. Let me ask you this, then. In that
5 efficiency has resulted from change in price forecast,
6 if the change in price forecast is what is responsible
7 in part for driving the improved efficiency in the load
8 forecast, you are not in a position, then, to tell them
9 what form that efficiency will take, or are you?

10 A. We give them the information as is
11 documented in the main reports, the end-use main
12 reports, which give the efficiency assumptions
13 underlying the various end uses, as they come about in
14 the 1990 forecast, being brought about by price effects
15 or construction rate effects or income effects or a
16 myriad of all sorts of effects, we give the net result
17 to them.

18 Q. You don't disaggregate it? It is an
19 aggregate affect of everything that has changed, if we
20 looked at it compared to the '88 forecast?

21 A. We give them, you know, UEC's
22 consumption numbers by end-use for various sectors.

23 Q. If we could turn to another topic
24 related to the human activity GDP drivers and so on,
25 and, first of all, population. Could you just explain

1 something for me?

2 In Exhibit 99, which was Mr. Rothman's
3 overheads, there was a graph of fertility rate, and you
4 don't need to turn it up, I just wanted to understand.
5 It says number of births, on the vertical axis. That
6 is number of births in that year, or is this number of
7 births expected for a woman born in that year? Could
8 you just...

9 MR. ROTHMAN: A. It is the calculation
10 made in that year for the number of births per woman
11 during her lifetime.

12 Q. I just want to understand, if there
13 is a nice, say, a peak in the year 1960, when does that
14 mean that there would be a peak in babies being born?
15 Can we simplify it that far?

16 A. I don't know. The way these are
17 calculated is that there is -- well, I don't know how,
18 exactly they are calculated. But there is a
19 methodology that takes into account the number of women
20 per child, and the age of mothers at first birth, and
21 some other stuff that I don't understand correctly.

22 So, really, I can't give you an answer to
23 that question. You could look up the numbers to see
24 when births actually peaked, but it would have been in
25 the '60s.

1 Q. If you don't understand it, I feel
2 better, at least. Let me put it that way.

3 Could you just tell us that? If we just
4 take this graph which shows a peak in this fertility
5 rate in the year '60, could you just tell us, go back
6 and find out for us, if we wanted to translate that
7 into a peak, when...

8 A. Peak in the number of births?

9 Q. Number of births, when that would be?
10 Is that within a comparable time frame, or thirty years
11 later, or what?

12 A. You actually can't tell that in any
13 case from the fertility rate, because you don't know
14 how many women are in the childbearing years at any
15 given time during that period. So, you can't, even if
16 you knew all the complexities of the calculation, you
17 couldn't tell when births would peak, just from the
18 rate.

19 Q. Don't you have to know that, though,
20 to turn this into a population and labour force driver?

21 A. Sure.

22 Q. All right, I understand what you're
23 saying, then, is that you couldn't do it directly from
24 this graph. There is some other information you use,
25 in addition to this graph, to get a different...

1 A. Yes. I think it is easiest just to
2 leave it where we were. I can get the information
3 about when births actually peaked. If you want
4 information about forecast births, I can get that, too.
5 But it sounds to me as if you are looking at what the
6 past population profile looked like, and I can get that
7 information fairly readily.

8 Q. That would be helpful, thank you.

9 While we are on the topic of population,
10 in Interrogatory 1.24.9, which was an AMPCO
11 interrogatory that they provided us with during their
12 cross-examination. And again, I don't think you need
13 to -- well, perhaps the witnesses should turn it up.

14 MR. B. CAMPBELL: What is the number
15 again, Mr. Poch?

16 MR. D. POCH: 1.24.9.

17 Q. Mr. Rothman, do you have that?

18 MR. ROTHMAN: A. Excuse me just a
19 moment, Mr. Poch. I'm just writing down this last
20 agreement, so that I won't forget to get it done.

21 Okay. Yes, now I have it.

22 Q. If you turn to the fourth last page
23 of their whole bundle, which is the last page of that
24 interrogatory, that is where you compare the population
25 forecast by age groups--

1 A. Yes.

2 Q. --to other forecasters'. And it was
3 already noted how and why yours are higher in aggregate
4 than Statistics Canada or Ontario Treasury and
5 Economics. I just want to make a couple of
6 observations on this.

7 Can I take it from the structure over age
8 groups of this difference that you are higher in the
9 labour force years. That is, sort of, 15 through 65,
10 pretty much, except for the latter one. So, that would
11 definitely impact electricity demand, relative to other
12 people's forecasts?

13 A. I...

14 Q. Let's put it this way.

15 A. I'd leave to Mr. Burke exactly how it
16 impacts direct electricity demand. It does tend to
17 produce a higher labour force, and therefore a higher
18 GDP.

19 Q. GDP, okay, that is good enough.

20 It is lower in the retirement years, and
21 higher in the young, 0 to 14, category. The 0 to 14
22 category, that would affect household formation rates,
23 Mr. Rothman?

24 A. I don't think so. I think that our
25 household formation rate forecasts work off a headship

1 rate, and the headship rate is influenced by the number
2 of people in the ages where they become household
3 heads, which would not be 0 to 14.

4 Q. Would it drive new home, or housing,
5 rates then?

6 A. No. Again those are driven by the
7 people in the house-buying years, which tends to be 35
8 to 45 or so. 35 to 55.

9 Q. Mr. Rothman, just looking at the
10 difference between Hydro and the other...

11 A. Mr. Burke suggests it might be 25 to
12 55.

13 MR. BURKE: A. 25 to 45.

14 MR. ROTHMAN: A. 45.

15 MR. BURKE: A. I would have said 25 to
16 35 is the peak house-buying years.

17 Q. Okay. So then, the relatively
18 elevated numbers for that age group here would have
19 that effect on GDP and load, as well?

20 A. Yes.

21 Q. I guess that is obvious. All right.

22 MR. ROTHMAN: A. You remember, Mr. Poch,
23 we had this discussion, I think with Mr. Rodger
24 somewhat earlier, about this age structuring. We noted
25 that the reason for our relatively lower age

1 distribution is our relatively higher immigration
2 rates.

3 Q. Okay. If we hold everything else
4 constant, this is, roughly, your numbers are roughly
5 two per cent higher than the other forecasters'. Is
6 there a rough correlation, in your view, between the
7 population and GDP?

8 A. Well, I talked at some length about
9 that in my evidence-in-chief, in which we said that the
10 linkage is essentially through the labour force, the
11 effect of population on the labour force, and the
12 direct effect of labour force on potential output in
13 the economy. So there is a link. It is not that
14 direct. And it partly depends on the age structure of
15 the population.

16 Q. I don't want to have to ask you to go
17 back and run your models. I'm trying to avoid that.
18 So I just wanted to get a back of the envelope from
19 you, if you could, the rough relationship?

20 MR. BURKE: A. We did provide a back of
21 the envelope sensitivity in interrogatory response. It
22 may have been even to yourselves.

23 Q. It may have been.

24 A. But I will write it down and I will
25 get it for you. It was an interrogatory response; it

1 provided a whole range of these sorts of sensitivities.

2 Q. That would be helpful.

3 MR. D. POCH: Mr. Chairman, did you want
4 to take a morning break? It would be--

5 THE CHAIRMAN: Yes.

6 MR. D. POCH: --convenient now.

7 THE CHAIRMAN: If this is a convenient
8 time, we will do it now.

9 ---Recess at 11:18 a.m.

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1 ---On resuming at 11:35 a.m.

2 THE CHAIRMAN: Mr. Poch?

3 MR. D. POCH: Thank you.

4 Q. Mr. Rothman, at page 309 of the
5 transcript of these proceedings, you were talking about
6 the LISA model in projecting GDP and you said:

7 "As I yesterday earlier, when we did
8 that..."

9 And this was, I suppose, the calibration
10 exercise.

11 "...we got a slightly higher growth
12 than we expected and, for a number of
13 reasons, we brought that down a little.
14 But basically, we have trusted the LISA
15 model's forecast for the September of
16 1990 long-term economy outlook."

17 I wanted to ask you about that
18 adjustment. Do you want me to back up?

19 MR. ROTHMAN: Mr. Campbell, do we have...

20 MR. B. CAMPBELL: Could I get the page
21 number, please?

22 MR. D. POCH: Yes. This is starting at
23 309 of the transcript, Volume 2.

24 MR. ROTHMAN: While we are getting that,
25 Mr. Poch, I wanted to comment on the earlier discussion

1 about the demographic forecasts. The numbers that we
2 have given you are our 1990 forecasts compared with
3 1990 or '89 forecasts from Statistics Canada or the
4 Ministry of Treasury. The latest forecast, the 1991
5 forecast we have - and some of these numbers are of
6 still preliminary - put us lower than both of those
7 sources in terms of our current population forecast.

8 So we are in the process of redoing that.
9 And I mentioned in my evidence-in-chief the possibility
10 that the new target for immigration announced by the
11 federal government could influence our population
12 forecast in an upward direction.

13 MR. D. POCH: Q. So Mr. Rothman, just on
14 that point then, there may be some volatility to those
15 projections by all three forecasters?

16 MR. ROTHMAN: A. There may be some
17 changes, yes. We are talking about growth, changes in
18 growth rates in the neighborhood of a tenth of a per
19 cent, but they--

20 Q. Compound?

21 A. --compound.

22 Q. All right. Mr. Rothman, do you have
23 that reference?

24 A. Yes.

25 Q. I just wanted to get a little

1 clarification of that. You made an adjustment to LISA,
2 did you make an adjustment as an add factor or did you
3 change one of the coefficients?

4 A. We add-factored capital investment.

5 Q. And when you do an add factor, that
6 just sort of lifts the line of the forecast through its
7 life by that amount constantly, or does it get
8 amplified?

9 A. I don't know exactly what they did
10 with that add factor, but I think that what we did was
11 to take something out of capital investment through the
12 piece, in order to reduce the productivity growth
13 through the piece.

14 Q. All right. And that adjustment has
15 been now embedded in the model and persists, or was it
16 a one-time adjustment?

17 A. When we go to do the next forecast,
18 that would be the basis from which we would start, but
19 we would have been aware of what adjustments had been
20 made to the model, so the model would include that
21 adjustment, yes.

22 Q. How much of an adjustment was it, in
23 terms of -- well, in absolute terms, as a percentage in
24 the year?

25 A. In the neighborhood of half a per

1 cent a year.

2 Q. And that compounds?

3 A. Yes.

4 Q. So, by the year 2010, 2015, what
5 percentage change is that?

6 A. Over 20 years, it's about a 10 per
7 cent change.

8 Q. The other calibration discussion we
9 had was how you deal with the splice, I believe is the
10 term. By that, I am referring to where the short-term
11 load forecast leaves off and the long-term forecast
12 takes over. I take it that's five years out?

13 MR. BURKE: A. Yes.

14 Q. Doctor, you are nodding. You have to
15 speak for the transcript.

16 DR. BUJA-BIJUNAS: A. That's correct.

17 Q. And my recollection of the evidence
18 is that there was a 10 terawatthour adjustment
19 required. You raised the jumping-off point for the
20 long-term forecast. I think it was the end-use
21 forecast, rather than the EEMO forecast.

22 A. The end-use forecast did have to be
23 increased to meet the short-term forecast.

24 Q. Was that in the '90 forecast or the
25 '88 forecast?

1 A. We did it in both forecasts.

2 Q. Okay. And do you do it five years
3 out in each case, because that's the length of time you
4 do the short-term forecast for?

5 A. The goal is to have the long-term
6 end-use forecast start at the last year of the
7 short-term. And so we don't just make an adjustment
8 to, say, the 1995 number. We look back from, say, 1990
9 to 1995, to try to find a way that would allow us to
10 get to the required increment by 1995 without a step
11 function in 1995.

12 Q. Is this what you call tuning?

13 A. That's correct, yes.

14 Q. And in terms of --

15 A. Let me rephrase that. That is part
16 of tuning. Part of tuning is having the initial years
17 meet the short-term, which is established. The other
18 part of tuning is after the official forecast is
19 finalized for the long-term, the end-use model is tuned
20 to be consistent with the official forecast.

21 Q. Okay. Just so I can get a feel for
22 this. 10 terawatthours would be roughly 1700
23 megawatts? My math; have I got it in the order of
24 magnitude at least?

25 MR. BURKE: A. It's seems too high.

1 Q. Can you tell us what 10 terawatthours
2 would be, roughly, in capacity terms -- peak terms?

3 A. Well, roughly, 10 terawatthours
4 represents 7 or 8 per cent of the current system, so I
5 would think, by 1995, it would be more of the order of
6 6 or 7 per cent. And 6 or 7 per cent of...

7 Maybe it is of the right order. It could
8 be of the right order, yes.

9 MS. PATTERSON: What was that number
10 again?

11 MR. D. POCH: Q. That was 1700
12 megawatts.

13 MR. BURKE: A. Could we check that?

14 Q. By all means. Let's just take 1700
15 megawatts as my estimate for the sake of discussion.
16 That's just the translation to peak from energy
17 forecast. And if we want to get to capacity, there is
18 a number of other adjustments to be made, right? We
19 have to allow for line losses and we have to allow for
20 reserve margin and so on. Just so we don't confuse
21 that, that's peak forecast, as opposed to capacity.

22 A. No, the forecast already has line
23 losses taken into account. It is at the generator.

24 So, what was other factor you wanted to
25 take into consideration?

1 Q. Reserve margin.

2 A. Reserve margin has to be taken into
3 account.

4 Q. Okay. Now, that 10 terawatthour
5 adjustment that you made to the end-use forecast at the
6 splice, again, does that just raise the line 10
7 terawatts throughout the long-term forecast, or does
8 that --

9 From what you have told me, it seems
10 consistent that that changes -- you have changed the
11 growth rate by adjusting a number of factors, and we
12 would expect to see that amplify, is that fair?

13 DR. BUJA-BIJUNAS: A. To some extent.
14 As I said, we try to provide an explanation for meeting
15 the short-term instead of just shocking it, and that
16 would imply somewhat of a greater increase in the
17 long-term, too.

18 Q. And have I understood the evidence
19 correctly that you didn't need to do much adjustment to
20 the EEMO model at the splice?

21 MR. BURKE: A. Yes, that's correct.

22 Q. So, can I take it from that that the
23 short-term forecast is more consistent with the EEMO
24 results?

25 A. Yes. But the EEMO results were not

1 used to develop the short-term forecast.

2 Q. There is a separate forecasting
3 methodology for the short-term?

4 A. That's correct. And the short-term
5 was finalized about four months before the 1990 EEMO
6 results were finalized.

7 Q. And the nature of the short-term
8 forecast, it's a mix of major customer surveys and
9 econometrics and so on, is that fair?

10 A. Yes, it's described in Exhibit 9.

11 Q. But the effect of all this has been
12 to move the end-use forecast 10 terawatthours closer to
13 the EEMO forecast at the start.

14 A. Yes.

15 Q. Now, I am wondering, if you routinely
16 do this adjustment, if required, at the splice, and
17 that splice is, by definition, five years out, because
18 that's the length of your short-term forecast. How do
19 you take into account the cyclical concern that you
20 have expressed?

21 DR. BUJA-BIJUNAS: A. Okay, one of the
22 things that we do, as I mentioned, is that we try not
23 to produce a shock in 1995, but provide some
24 explanation from, say, 1990 to 1995.

25 If, during those years, there were high

1 construction booms or any other activity that we feel
2 an explanation for this high short-term growth, we
3 mitigate that to some extent, then, in the long-term.

4 So, it's not as a continuation of the
5 same assumptions all the way through, from the
6 short-term tuning; we look to see what must have
7 happened or what is likely to happen to produce those
8 short-term numbers. To the extent they don't seem
9 likely in the long-term, we do offset that.

10 Q. But you do, through this adjustment,
11 set the starting point of the long-term forecast equal
12 to the end point of the short-term forecast?

13 A. Yes, the starting point is, but it
14 doesn't necessarily mean that the growth rates, in
15 fact, isn't; the growth rates are not.

16 Q. So, every year, it's going to be
17 different, each time you do a new forecast. That
18 5-year point may be at the top of the cycle, the
19 short-term cycle, or the bottom or somewhere in the
20 middle?

21 MR. BURKE: A. No, the issue of where
22 the short-term forecast is is something I think I
23 should speak to.

24 It is intended to be neutral in that
25 sense. That is, it is intended that we would be at the

1 midpoint, in some sense, of cycles as the base value.
2 I think I have said earlier in this hearing that, with
3 the update to the forecast that we prepared in January,
4 this is the first time where we have not actually
5 reached that neutral point in 1990 five years out, but,
6 in fact, it's six years out this time.

7 That is, in the update, given the
8 information we have about the stage we are at in the
9 current recession, and the path that we see to come out
10 of that recession and return to our long-term growth
11 path, we didn't feel we could do that within five
12 years. So, we are now saying that 1997 is the point,
13 if we were to do this forecast again.

14 But, when we did it the last time, that
15 is the 1990 forecast, based on the July 1990
16 short-term, the intent was that 1995 was, you might
17 say, cyclically-neutral, a balance point in the cycle,
18 and weather-corrected. So that the intent was to be in
19 the midpoint of that.

20 Q. But it was just luck that that
21 neutral point happened to be five years out at the end
22 of the short-term forecast?

23 A. Well, not really, in the sense that
24 economic cycles are usually, you know, five years or
25 so, seven years, in that range, and we essentially

1 design - I think Mr. Rothman can comment on this - the
2 economic path to track the cycle for the first two or
3 three years, and then to, in fact, converge to the
4 long-term growth path in the last year or two of the
5 short-term; that first five-year block.

6 Is that fair to say?

7 MR. ROTHMAN: A. Yes, that's correct.

8 Q. So, let me see if I understand then.

9 The short-term forecast -- while you do, on a one or
10 two-year out basis, try to track where you are in the
11 cycle and give the rest of the corporation some feel
12 for that, so that they crank up the right number of
13 generators, as a forecasting practice, you try to have
14 it converge, come back, to this longer term path we
15 have spoken of, and be there by the 5-year mark?

16 MR. BURKE: A. That's the intent, yes.

17 Q. And that longer term path is
18 something you get from these longer term projections,
19 again, that we have spoken about?

20 A. For GDP you mean?

21 Q. Yes.

22 A. Yes.

23 Q. So we shouldn't be surprised, then,
24 that, generally speaking, the adjustment at the splice,
25 between the end of the short-term and the EEMO model,

1 which is driven by these longer term projections, is
2 generally going to be pretty small?

3 A. Well, I don't think you can infer
4 anything; it's different every year. The models are
5 different every year. This year, we happen to be able
6 to, with the EEMO model, it happened to be close, but
7 that has not necessarily been the case in previous
8 years.

9 Q. But it is these longer term trend
10 patterns for things like GDP which are the predominant
11 drivers both for EEMO - and I am not saying you don't
12 have adjustments - and for the trend line that you try
13 to get your forecast to come close to at the end of the
14 short-term load forecast?

15 A. Yes. And also the same drivers that
16 drive the end-use model as well.

17 Q. Okay. You told me it's the same
18 driver that drives the end-use?

19 DR. BUJA-BIJUNAS: A. The GDP numbers
20 are used as explanatory variables in deriving things
21 like physical unit forecasts and commercial floor
22 space, et cetera. So, there is an intermediary
23 calculation of other drivers. But it is one of the
24 explanatory variables.

25 Q. So you have already captured that

1 effect in your first run at the end-use model, to the
2 extent that model relies on those drivers, which is
3 what you have just told me. And then, at the 5-year
4 mark you go back and adjust it, to get closer to the
5 other two forecasts you do, or at least to one of the
6 other forecasts you do, the short-term.

...

1 [11:53 a.m.] So, you capture it twice, in a sense.
2 There is two points where you are making -- one is
3 built into the model and one is an explicit adjustment
4 later to conform to those long-term trends.

5 MR. BURKE: A. Okay. Let me make sure I
6 am clear about what the two approaches are that you are
7 talking about.

8 The first approach is that we design our
9 economic drivers so that they are consistent with the
10 long-term trend by the time you reach 1995. And then
11 there is the adjustment that we make to either of the
12 long-term models to be at the starting point in 1995.

13 Q. Yes.

14 A. Essentially, there is, implicitly, a
15 judgment being made here that the short-term forecast
16 is a better picture for those first five years than we
17 would be able to produce with either of the two larger
18 models.

19 That may or may not be correct by
20 hindsight, but given the time that we have to produce
21 the short-term forecast in and the frequency with which
22 we have to update the short-term forecast, we have not
23 been able to use our long-term models in advance of
24 setting short-term years.

25 So, you know, if we had all of that

1 information at the same time, we might do things
2 differently. But given the way it actually works, each
3 of these elements contributes to an internally
4 consistent long-term forecast.

5 Q. I understand your desire to be
6 internally consistent.

7 The short-term forecast for the first
8 year or two is very much influenced, I take it, by what
9 has happened in the last year or two and some detailed
10 knowledge you get from customers?

11 A. That's correct.

12 Q. And you have already said that in the
13 latter part of the short-term forecast, you then trend
14 it towards what you expect from those long-term drivers
15 like GDP?

16 A. Yes.

17 Q. Okay.

18 I would like to go on and talk about
19 structural trends in the economy. Now, perhaps we
20 could have Chart 13. This is page 13 of Exhibit 107.

21 Mr. Rothman, I read your comments before
22 the Select Committee in 1988 - they are in one of our
23 exhibits - where you spoke of a 60-year trend. We
24 haven't got that in the materials in front of us, but a
25 60-year trend of increasing intensity, taking more

1 electricity to make a dollar of GDP. And then, in
2 about '82, a change towards what you are now telling us
3 is a decaying or decreasing intensity.

4 Just to facilitate discussion, we have
5 just put up the 1947 to current, and then projected to
6 2010 on the overhead, where that shift in '82 is quite
7 apparent.

8 I am, I guess, intrigued. Why in an era
9 of, you know, computerization and air-conditioning and
10 microwaves, VCRs, all these things we have spoken of,
11 has the economy started to produce more with less
12 electricity?

13 Is there any general explanation?

14 MR. ROTHMAN: A. The general explanation
15 that I favour is that electricity prices rose
16 significantly in real terms in around 1976 and '77.

17 And as we have been discussing with Mr.
18 Burke, it takes some time for those price effects to be
19 felt, and that puts a significant effect from that into
20 the time period of around the early 80s.

21 There is more than that happening. And
22 clearly, the sudden break in 1981 and '82 is related to
23 the cyclical history of the time. There was a severe
24 recession in Ontario in 1981, '82; particularly hard
25 hit were the goods-producing industries.

1 And among goods-producing industries,
2 particularly hard hit were the electricity-intensive
3 goods-producing industries, like the mining industries,
4 the forest products industries, the primary metals
5 industries, chemicals.

6 Q. So, if I can interrupt you, then,
7 what you are saying is, amongst other factors, the
8 overall economic climate affected the relative makeup,
9 the structure of the economy, the relative contribution
10 of these different sectors, some of which are more or
11 less, electricity-intensive?

12 A. Yes. That is what I said.

13 Q. Okay. Now, if you could just turn to
14 page 13(a). You have just plotted primary energy
15 intensity for the country against GDP. I guess it
16 would be for the country again. By the way, we have
17 netted out international trade in energy.

18 An improvement in intensity, then, is
19 nothing -- first of all, without getting into the
20 detailed numbers of this, this is a trend you are well
21 aware of, I take it?

22 A. Yes.

23 Q. All right. And so an improvement --

24 MR. B. CAMPBELL: I am sorry. Mr. Poch,
25 I would just appreciate it if you would make it clear

1 that -- as I understand the sources, these are not any
2 sources from any of the material in this hearing.

3 I don't mind questions about whether this
4 shows a picture that is consistent, but I take it you
5 are not asking the panel to be comfortable with any of
6 the actual numbers.

7 MR. D. POCH: No, no. I tried to make
8 that clear and apologize if I wasn't clear enough. I
9 just wanted to give a graphic here for purpose of
10 discussion, and Mr. Rothman has agreed that this is the
11 kind of trend he is aware of.

12 Q. And just to further clarify the
13 record, this is for energy, all forms. It is not
14 electricity, clearly?

15 MR. ROTHMAN: A. Yes, and it is not a
16 monotonically decreasing series.

17 THE CHAIRMAN: I am sorry, it is not a
18 what?

19 MR. ROTHMAN: Monotonically decreasing
20 chart. It goes up sometimes, and then it goes down.

21 MR. D. POCH: All right.

22 Q. I guess the only point I am making
23 here is that we shouldn't worry that we can't see an
24 improvement of intensity persist for a long period of
25 time. That is quite feasible. And in the broader

1 energy market, we have seen that; is that right?

2 MR. ROTHMAN: A. What do you mean? I am
3 not sure what you are asking, sorry.

4 Q. Well, I just want to make sure that
5 there is no suggestion that, just because intensity is
6 improving, it is going to bounce the other way at some
7 point, inevitably?

8 A. What do you mean by improving?

9 Q. We are using less to do more; I call
10 that improving.

11 A. Okay. So, just because energy
12 intensity has fallen to some point, there is no
13 necessary suggestion that it has to reverse itself and
14 increase again; I agree with that.

15 Q. Okay. Now I would like to get into
16 some specifics about your forecast of the structural
17 makeup, and I would like to do this by reference to
18 Exhibit 1.7.14, an interrogatory from the Coalition.
19 This is attached, I think, as the last of the bundle of
20 interrogatories that was added later.

21 THE CHAIRMAN: 1.7.14, is it?

22 MR. D. POCH: 1.7.14.

23 Q. Do you have that, Mr. Burke?

24 MR. BURKE: A. I have it. Well, the
25 most important person to have that is Dr. Buja-Bijunas.

1 Q. Yes, all right. Doctor, are you --

2 A. And I just want to make sure she is
3 all set up before you...

4 Q. Doctor, do you have that?

5 DR. BUJA-BIJUNAS: A. Yes, I do.

6 THE CHAIRMAN: Wait.

7 MR. D. POCH: Q. Perhaps I could ask Mr.
8 Martin to make sure that Mr. Campbell has a copy and --

9 THE CHAIRMAN: Just hold it a second,
10 please. We are just getting this exhibit. Here it is.

11 MR. D. POCH: Q. Now, first of all, just
12 noting - and I see the way this was collated - it
13 appears the first page of the response has been
14 attached at the back.

15 DR. BUJA-BIJUNAS: A. Yes, in a
16 Xeroxing, the pages got confused, that's correct.

17 Q. All right. Oh, good, it wasn't my
18 mistake.

19 A. So, it doesn't start off with the
20 word 'clearly.' (Laughter)

21 Q. Well, that might shorten things a
22 bit.

23 But, in fact, I would like to take your
24 attention to the tables, and table 3, in particular, to
25 start. Now, this is a table of the kind of ratio we

1 saw on the previous slide, electricity to GDP, but
2 broken out by sector.

3 Am I reading it right, that the
4 industrial sector, as you categorize uses that have
5 fallen, et cetera is, roughly, three times - or moving
6 towards three times - as intensive in its electricity
7 use per dollar of output as the commercial sector?

8 A. That's correct.

9 Q. Okay. And there's also variations of
10 intensity within the sectors?

11 A. Certainly, yes.

12 Q. All right. And if we turn to table
13 7 - this is within the industrial sector - you have
14 created two groups.

15 Can you just tell us what is in group 1?

16 A. Okay. Group 1 is what I refer to as
17 processing industries. And they include paper and
18 allied, primary metals, chemicals and mining, including
19 smelting and refining.

20 And group 2 are what I refer to as
21 fabrication assembly, which are all other industries,
22 like auto manufacturing, food and beverage, industries
23 like that.

24 Q. What percentage of the industrial
25 electricity does group 1 account for?

1 A. Approximately 60 per cent.

2 THE CHAIRMAN: 50?

3 DR. BUJA-BIJUNAS: 60, 60 per cent.

4 You will find that in table No. 6, in
5 fact.

6 MR. D. POCH: Q. Okay.

7 DR. BUJA-BIJUNAS: A. Historically,
8 group 1 had about 68 per cent, dropping down to 62 per
9 cent; and you can see the growth in group 2 go from 32
10 per cent to 38 per cent.

11 Q. Okay. So, a shift within the
12 industrial sector of the relative makeup of group 2
13 type activities versus group 1 type activities in this
14 example can have a significant impact, then, on the
15 overall intensity of the industrial sector in your
16 forecasts?

17 A. That's correct.

18 Q. All right. Now, you have, in fact,
19 of course, looked at that.

20 And I wanted to know, do you use
21 input/output techniques when you model changes into the
22 future of structural shift?

23
24 ...
25

1 [12:07 p.m.] A. What this is is taking the end-use
2 forecast results, it is taking our forecast, dividing
3 up the electricity consumption by industry, so we can
4 have a group 1 and a group 2, and then assigning to
5 each of those groups what the GDP forecasts are.

6 It is an output calculation, or a
7 residual calculation, after having done the forecast.
8 It is a consistency check, it is a way of looking at
9 the implications of the forecast, but there is no
10 input/output assumption built into our forecast.

11 Q. Just so we understand what we are
12 talking about, an input/output approach is an approach
13 where you have some kind of a model of the economy, you
14 make a change to one input, and because there are
15 interrelationships between that industry and others,
16 you can expect output changes in other sectors as well?
17 Is that right?

18 MR. ROTHMAN: A. Mr. Poch, perhaps we
19 could -- you and I should be discussing that.

20 Q. Fine.

21 A. There is, in fact, some input/output
22 analysis behind this forecast, because the specific
23 industry forecast that Dr. Buja-Bijunas was using for
24 her end-use model are the industry level forecasts from
25 LISA, plus the physical unit forecasts, which are

1 produced by a set of specific equations from LISA. The
2 LISA model uses an input/output analysis to produce
3 those industry level activity forecasts.

4 Q. So, the end-use model, then, is not,
5 strictly speaking, just a forecast of a given
6 commodity, for example, like board feet of wood. It
7 takes as one of its inputs the LISA output for what's
8 going to happen to that sector of the economy
9 generally?

10 DR. BUJA-BIJUNAS: A. Basically, yes.
11 You have to somehow generate how many tonnes of rebar
12 are produced, and that is governed by the GDP forecast.

13 MR. ROTHMAN: A. That comes from a set
14 of what we call physical unit forecasts, because they
15 are forecasts of output in physical units, like board
16 feet of wood, tonnes of steel, tonnes of cement. And
17 they are produced by the economic forecasts section,
18 using the output of the LISA model. They are a
19 separate set of equations, but they use the output of
20 the LISA model.

21 Q. So, in the industrial sector, then,
22 you basically take the LISA output for growth of that
23 sector, and output of that sector, by product or what
24 have you, and what you do in the end-use model then, is
25 make some assumptions about the technology that will be

1 used?

2 DR. BUJA-BIJUNAS: A. Basically. For
3 example, if one of the physical units is newsprint
4 production, we get then forecasts on a yearly basis of
5 how much newsprint will be produced, say, over the next
6 twenty years.

7 In the end-use approach, what we do is we
8 will look at how much newsprint is currently produced,
9 and all the technologies and processes in place to
10 produce that newsprint, and forecast out what other
11 technologies or equipment will be in place to produce
12 future newsprint.

13 Q. And you also forecast what the
14 conservation trend is going to be in terms of inside
15 that industry?

16 A. By forecasting out what sort of
17 technologies are most likely to be in place, you then
18 get a change in the intensity per tonne of newsprint or
19 whatever, resulting from technology shifts.

20 Q. So, if we have a concern, such as the
21 one, for example, you discussed with the Board at the
22 outset, about recycling becoming more of a larger -- or
23 taking up a larger portion of the paper industry, and
24 where it is going to locate, that is really something
25 that should have been handled in the LISA model,

1 telling you what the output of that industry is going
2 to be in Ontario?

3 A. The physical unit forecast for
4 newsprint incorporated considerations of the impact of
5 recycling on newsprint production in the province. In
6 addition to that the end-use model, then, in producing
7 that newsprint at the volumes specified specifically in
8 the forecast turn to newsprint recycling technologies,
9 and so, the technology efficiency impact is captured in
10 end use.

11 Q. And you are responsible for that
12 latter part?

13 A. That is correct.

14 Q. And Mr. Rothman's group is
15 responsible for the former part, or is there interplay?

16 A. There is interplay insofar as, in
17 doing the end-use forecasts, we try as much as possible
18 to be as aware as possible of what's happening at the
19 various mills in the province.

20 Certainly, we then feed that information
21 to the individuals doing the physical unit forecasts.
22 So that, if we are aware a mill is putting in an
23 additional plant next year and will be increasing its
24 production, that is information that is available to
25 them in producing their physical unit forecasts.

1 MR. D. POCH: Excuse me.

2 ---Off the record discussion.

3 MR. D. POCH: Q. Perhaps we should make,
4 for a point of discussion, a distinction between what
5 they are doing now, in the short-term, and the
6 long-term. Am I fair in concluding that the longer
7 term trend towards recycling or location is something
8 that would predominantly then be in the sort of LISA
9 exercise?

10 DR. BUJA-BIJUNAS: A. It would be
11 predominantly, but I still maintain there is -- because
12 we try to keep very current with what the industry is
13 doing, if new technologies which will become available
14 in, say, ten, fifteen years would be of benefit to the
15 industry, in terms of competitiveness and production in
16 the province, that information is discussed with
17 individuals doing the physical unit forecasts, so there
18 is some interplay.

19 MR. ROTHMAN: A. We try within the
20 division, Mr. Poch, to make use of all the information
21 we have in the division, whether it is in a unit given
22 strict organizational responsibility for a given
23 product or not. And as you can infer from this
24 testimony, and earlier testimony, one of the things
25 that has made the division function well has been that

1 ability to interchange information, whatever the
2 source. And that is because we get along well with
3 each other and talk to each other a lot.

4 Q. Glad to hear it.

5 Exhibit 1.7.14, which we were just
6 looking at, this is explaining to us all the various,
7 or breaking out all the various structural shifts
8 embedded in the forecast. Is this document -- are the
9 numbers generated to create this document, did they
10 come out of the EEMO, or the end-use or the LISA?

11 MR. BURKE: A. Well, maybe I will -
12 monkey in the middle here - I will answer that one.

13 Effectively, they are based on the
14 recommended load forecast.

15 DR. BUJA-BIJUNAS: A. That is right, we
16 use the tuned end-use, which is the recommended.

17 Q. Let's look at this document then. At
18 table 1; you start at table 1, and you have the product
19 of each of these two sectors. Commercial/industrial we
20 are looking at here. And you start in 1970. First of
21 all, have you tracked this back to earlier starting
22 dates, to look for longer term trends?

23 A. This particular analysis was done in
24 response to 1.7.14, which requested the period starting
25 in 1970. So that is all that we did, starting in 1970.

1 Q. So, this kind of look at these kinds
2 of trends is not something, then, that is part of your
3 forecasting exercise? You have done it special, for
4 me?

5 A. Well, the extent of the analysis in
6 terms of quantifying structural shifts, between
7 commercial and industrial, and between components of
8 commercial and components of industrial, we had not
9 quantified before. But, I think, in the direct
10 evidence, there were a number of curves I presented,
11 for example, of industrial electricity/GDP ratio
12 starting in 1960s. So, we have looked at that sort of
13 information, but not as detailed a level.

14 Q. Okay, again let me just verify that
15 I'm reading this right. If we look at table 1 in the
16 industrial column, we see the per cent make-up of the
17 sector within the dual sector, of industrial dropping
18 from 32 to 29 or so. And then, you are projecting that
19 it is going to stay fairly constant for the next 25
20 years.

21 Then can we call this a sort of one-shot
22 adjustment that has happened? You are not expecting a
23 shift like that again?

24 A. Since it is GDP, I think Mr. Rothman
25 should respond.

1 MR. ROTHMAN: A. I am sorry, could you
2 repeat the question?

3 Q. In the industrial column, we see the
4 per cent make-up of industrial in the GDP split between
5 the industry and commercial.

6 A. Yes.

7 Q. Coming from 32 down to around 29, and
8 then holding fairly constant through that--

9 A. Yes.

10 Q. --certainly through the 25-year
11 period you are forecasting here.

12 I take it from there, that there was
13 something that happened from '70 to '80 that was really
14 a one-shot adjustment or shift?

15 A. Probably not. There is a long period
16 here of relative declines in goods-producing
17 industries, as I spoke about in my evidence-in-chief.
18 Our forecast is that that decline will continue but
19 decelerate.

20 Q. So, what we are catching here is the
21 end of a steeper decline and a relative leveling off; a
22 very slight decline in the future.

23 A. Yes. The industrial sector here is
24 defined differently from the sectors that I was talking
25 about, but the trends are for similar reasons.

1 Q. That trend you just spoke about, the
2 decline of that goods-producing, is that a long-term
3 trend?

4 A. Yes.

5 Q. And how far back does that extend?

6 A. We don't have much data, very far
7 back as far as I know. But the data that -- we
8 certainly don't have data for Ontario that are very
9 good before the '50s, but even through the '50s, that
10 trend extends.

11 To reiterate, what is really stable
12 through the period for which we have got data that we
13 like, is that manufacturing share is very stable. What
14 declines rapidly is the primary sector share.

15 MR. BURKE: A. Mr. Poch, I will stick my
16 neck out and suggest that, although, as Mr. Rothman
17 says, the quality of information is not that great, my
18 understanding is that in the '50s, there were roughly
19 equal shares of commercial and industrial value added
20 in the province.

21 MR. ROTHMAN: A. Roughly equal shares of
22 goods-producing and service-producing industries in the
23 province, and it crossed over sometime in the '50s.
24 But goods-producing would have been a majority of the
25 activity in the province before then, and has become

1 less than half since.

2 Again, a large fraction of that shift
3 came from the primary industries. When we go back 70
4 years, agriculture would have been probably the largest
5 industry in the province, and it is now in the
6 neighborhood, I think, of three, four per cent of total
7 output.

8 Q. Just looking at table 2, where we
9 look at electricity consumption, and just as a contrast
10 to product, we see a somewhat more dramatic change from
11 66 down to 54, 52. Maybe not so much dramatic, but in
12 the commercial side, we see 34 rising to 46, 48.

13 So, a change in the make-up of the
14 product can result in a different change, and in some
15 cases, a more dramatic change, in the proportion of
16 electricity that that sector is demanding.

17 A. Yes. In addition to these aggregate
18 shifts, there are shifts within these sectors, and I
19 think that Dr. Buja-Bijunas was about to talk about
20 that a little.

21 DR. BUJA-BIJUNAS: A. That is okay.

22 MR. ROTHMAN: A. About something else?
23 Okay.

24 MR. D. POCH: Q. Did you want to say
25 something, Doctor?

1 DR. BUJA-BIJUNAS: A. No.

2 MR. ROTHMAN: A. My point was just going
3 to be that there are lots of things that could cause
4 that difference in relative shifts in consumption.
5 There could be different changes in intensities, in
6 particular uses within industries; there could be
7 differing shifts from energy-intensive to non-intensive
8 industries within those sectors; and there could be
9 different changes in modes of production across the
10 sector. So you just can't tell what is going on within
11 those numbers.

12 Q. And looking at the total output of
13 the industrial -- I am sorry, electricity consumption
14 of industrial, it went down from 66 to 59 to 54. That
15 is over -- that is 12 per cent over the nineteen years
16 leading up to your forecast. And you are projecting it
17 is going to go down only 2 per cent in the next 26
18 years? Have I got that right?

19 DR. BUJA-BIJUNAS: A. Excuse me, who are
20 you addressing?

21 Q. Doctor, you can help me. Am I
22 reading this right?

23 A. That is correct.

24 One of the things I'd like to emphasize
25 about this whole issue of share is the ratio of two

1 commodities. It is not just a representation of what
2 is happening in one, it is a relative concept. And so,
3 a share can change dramatically because something else,
4 the other half, is doing something. So, you have to be
5 careful how much you read into it.

6 Q. And, in fact, if we look at the
7 industrial share in table 2, we see that it was
8 continuing. For electricity, it was continuing through
9 the 1980s to trend down. But in its output in table 1,
10 it had already stabilized in its share. So, there must
11 be component shifts within the industrial sector, as
12 opposed to its relative share of the
13 industrial/commercial output that are accounting for
14 that, or some of that. Is that fair?

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24 ...
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1 [12:25 p.m.] A. It is true the component intensity
2 did change, yes.

3 Q. And if we go to table 7 and look at
4 this rough categorization into two components, group 1
5 and group 2, we see that the group 1 industries, having
6 increased in the '70s, undergo about a 6 per cent
7 decline over the next 25 years; that's what you are
8 forecasting despite the increase?

9 A. You mean despite the fact that they
10 increased during the 1970s?

11 I guess what I would say is I didn't
12 forecast the 6 per cent decrease despite the fact it
13 was 21 per cent increase. That forecast is based on
14 assumptions regarding what I think the industry will be
15 doing in the future.

16 Q. Okay. I understand that you don't
17 forecast that measure particularly.

18 A. That's right.

19 Q. This is an output. But what your
20 forecast, the sum of all your forecasts, are telling us
21 is that there has been this increase, and despite
22 that - 7 per cent, I think the number was; I am sorry,
23 I don't have the number - but despite that increase
24 through the '70s and into the '80s, we are now
25 expecting a decrease of 6 per cent over the next 25

1 years in that?

2 A. In the Group 1 industries, you are
3 referring to?

4 Q. Yes.

5 A. Yes.

6 Q. Now, is that - and this, maybe, by
7 definition, is the case - that that improvement, if you
8 will take my value judgment, in the energy output ratio
9 of group 1 industries, is that consistent with the
10 basic load forecast, that is, before the impact of DSM?

11 A. That's correct, yes.

12 Q. Is it consistent with the INDEPTH
13 forecast, which is the industrial component of the
14 end-use forecast?

15 A. The INDEPTH forecast is used as a
16 modelling mechanism for some of the industries, not all
17 of the industries. But we use an end-use model for the
18 remaining industries.

19 I am just saying that INDEPTH, as a
20 modelling formalism, is not used in the analysis of
21 every industry, but it is used for pulp and paper, iron
22 and steel, industrial chemicals. So in that respect,
23 most of it is handled by --

24 Q. Most of group 1 is caught?

25 A. Yes.

1 Q. And this is consistent with that?

2 A. Pardon me?

3 Q. And this is consistent with the
4 output of your INDEPTH model?

5 A. That's right, yes.

6 Q. And is it consistent with the EEMO
7 forecast, Mr. Burke?

8 MR. BURKE: A. As I indicated in direct
9 evidence, the EEMO forecast was a little bit higher in
10 terms of total forecast for the sector than the end-use
11 forecast, but also we do not have the decomposition of
12 the EEMO forecast by industrial category. So, in fact,
13 the end-use forecast was adopted in its entirety for
14 the industrial sector, as the recommended forecast.

15 Q. So what you are telling me is you
16 don't know because you don't do a disaggregation in
17 EEMO, but it may not be relevant because you have in
18 fact adopted end-use for that?

19 A. Yes, and we also have discussed why
20 we can't do a disaggregation econometrically.

21 Q. And I see you are forecasting a
22 deterioration in the electricity productivity in group
23 2, from '89 to the end of the forecast period, 2015.
24 It's moving from .5 to .53, with a little rise in the
25 middle.

1 DR. BUJA-BIJUNAS: A. Yes.

2 Q. Can you tell me what is causing that?

3 A. I would have to go through each
4 individual industry, but an example would be the food
5 and beverage industry. Our knowledge of that industry,
6 and the industry reports on it, have indicated a growth
7 in the use of membrane separation technologies, et
8 cetera, which are electricity-intensive. So an
9 industry like being a fabrication/assembly, or in that
10 category, would push the intensity up.

11 Q. Now, if we go to table 13, this is a
12 component break-apart of the commercial sector. I am
13 looking at the intensities there. And this was
14 discussed a bit already; I won't go into detail. But
15 you are showing that the ratio is going to improve
16 quite dramatically in the institutional sector, it
17 seems, over the forecast period, but deteriorate in the
18 office and retail building segments. And I take it
19 that's consistent with your 1990 commercial forecast?

20 A. Yes, it is. I would like to also
21 point out the fact that...

22 One of the reasons why we try to -- when
23 we look at the intensities of the commercial sector is
24 to do, in terms of square footage, is that...

25 I think the results are easier to

1 understand if we look at this intensity as commercial
2 electricity per square foot ratios, which I believe I
3 gave in my direct evidence.

4 Okay, so if you look Table 9, for
5 example, because of this difficulty of understanding
6 the concept of GDP in the commercial sector, as opposed
7 to output in the industrial sector. So, in a square
8 foot, on a kilowatthour per square foot basis, yes,
9 there is an increase, but you will notice that the
10 increase in the office and retail sector goes from, for
11 example, office, 29 kilowatthours per square foot goes
12 to 38. Institutional starts at a much lower intensity
13 and also increases.

14 Q. So, this is an example, then, of how
15 looking at output is often too crude a tool, because
16 institutions don't have the same measurable dollar
17 output as, say, offices. And when we look at square
18 footage, we do find that they are tracking each other
19 in their intensity trend; is that fair?

20 A. Yes, when you think of it in terms of
21 square footage you can ascribe physical equipment, and
22 things that use electricity and related, to the sort of
23 activities that are taking place in that sort of
24 environment.

25 Q. All right. Now, let's take a look at

1 table 4. And I will see if I am reading this one
2 right. Do I take it that what this shows is that the
3 structural shifts from industry to commercial, in terms
4 of the shift in the structure of the economy, have the
5 effect of reducing overall electricity to GDP. And I
6 assume you mean GDP provincial--?

7 A. That's right; that's correct, yes.

8 Q. --ratio, by 3.5 per cent, over the
9 19-year period, from 1970 to '89.

10 A. That's correct.

11 Q. Okay. And is forecast to result in a
12 further reduction of 1.1 per cent over the next 26
13 years?

14 A. That's correct.

15 Q. So, in percentage terms, the impact
16 is going to be about one-third as important over the
17 next 25 years as it was in the last 19, and in absolute
18 terms, about half as important?

19 A. Yes. And that falls out of tables 1
20 and 2, which we discussed this morning.

21 Q. Yes. Now, as between shifts from
22 group 1 to 2 industries then, at table 8, a little more
23 dramatic, we see that the shift between those two
24 components within the industrial sector reduced
25 electricity to GPP intensity by about 24.4 per cent in

1 the 19 years, 1970 to '89, but will bring it down by
2 only 7.7 per cent over the next 25 years, according to
3 your forecast?

4 A. That's correct.

5 Q. All of which just confirms the last
6 sentence in your reply that structural effects have had
7 a greater impact historically than they are expected to
8 have in the forecast period?

9 A. That's correct.

10 Q. Now, these four industries that you
11 you have told us, in group 1, account for about 60 per
12 cent of industrial electricity use. Is it fair to say
13 their electricity intensities are quite out of
14 proportion to their contribution to the GPP?

15 A. Out of proportion. Certainly, the
16 electricity to GPP ratios are very high.

17 Q. So, what I am getting at is that a
18 relatively minor change in the relative importance of
19 these industries, because they are so
20 electric-intensive can have quite a magnified effect
21 when we look at the demand for electricity?

22 A. This is correct, yes.

23 Q. So you must, I take it, devote
24 considerable time and energy to understanding these
25 group 1 industries?

1 A. That's one of the reasons why most
2 the INDEPTH modelling effort is toward these
3 industries.

4 Q. Do you have individuals in your group
5 that specialize in each of these industries?

6 A. I wish!

7 Q. So do I.

8 A. There is one individual.

9 Q. Okay. Poor fellow or woman.

10 We see quite a significant dampening of
11 the trends in the these shifts we have been speaking of
12 in the forecast period compared to the 19 years we have
13 just gone through. Have you gone back and looked at
14 the preceding eras to see what kind of -- the scale of
15 the shifts that had been going on then?

16 A. Well, that is a GDP shift we are
17 talking about and I think that should be addressed to
18 Mr. Rothman.

19 Q. Mr. Rothman?

20 MR. ROTHMAN: A. Well, yes, Mr. Poch, we
21 have. And as I emphasized, the majority of this shift
22 has been with respect to the primary industries. And
23 we are not forecasting -- we are forecasting some --

24 Q. I am not asking what you are
25 forecasting. I am asking if you have gone back and

1 looked the period prior to the 19 years which we have
2 just gone through. We have, I think, elaborated, quite
3 in detail, the distinction between your forecast and
4 the last 19 years. And I am wondering what the
5 experience has been in eras gone by, and if there were
6 these kinds of changes in structure in the past?

7 A. Yes. In fact, some of what we see
8 here, some of the pattern that we see here, I think it
9 is worth noting, is not that the -- what is shown here
10 as the process industries, have either stopped growing
11 or grown very slowly, but rather that the industries
12 that Dr. Buja-Bijunas has described as the fabricating
13 and assembly industries, have grown relatively quickly.
14 So that, even though their growth rates are lower,
15 their growth rates are still positive.

16 Take my earlier example of the
17 agricultural industry, if we go back 70 years as I
18 suggested, it would probably have been the largest
19 single industry and is now much smaller as a fraction
20 of the total. I wouldn't be at all surprised, though,
21 if total agricultural output in Ontario were now
22 greater than it was 70 years ago, even though it's a
23 much smaller fraction of the total.

24
25 ...

1 [12:40 p.m.] So, some of that is what is going on
2 here; even though these industries are losing share,
3 they are not failing to grow. They are just growing
4 slowly, so --

5 Q. Mr. Rothman, my question was about
6 the kinds of shifts in the structural make-up--

7 A. Yes.

8 Q. --that we have seen go on in the last
9 19 years, and that you are not forecasting will persist
10 at the same level in the next 25. And I am asking you:
11 Have you gone back and done an analysis, prior to the
12 19-year period, to see to what extent those shifts have
13 been occurring at that kind of level in the past?

14 A. If you are asking me if we have done
15 an analysis of this type, that is, if we have looked
16 carefully at what kinds of industry shifts there have
17 been within, say, the manufacturing sector, and
18 carefully calculated that, the answer is no.

19 Have we looked at what we believe to be
20 the causes of the shifts that we have observed in the
21 past, the answer is yes.

22 And I have just given you one --

23 Q. I am not sure what the answer to my
24 question was.

25 We have talked about the kind of

1 structural changes, the make-up the economy - and
2 leaving aside the fact that the economy is growing -
3 there's changes in the make-up of the economy, and we
4 have agreed that that make-up can have quite an impact
5 on the relative electrical intensity of the economy.

6 A. Yes.

7 Q. And we have seen that that make-up is
8 changing, relatively significantly in the last 19
9 years; you are not forecasting this change so
10 significantly in the next 25; and I am just asking you:
11 Have you gone back and seen -- if you have seen that
12 degree of structural change in the make-up in prior
13 periods, or have you not considered that something, you
14 know, that, in your methodology, is necessary to do?

15 THE CHAIRMAN: I thought he answered the
16 question. I thought he answered the question. He said
17 he had done some things, but he hasn't done the kind of
18 analysis that is in this interrogatory, which I suppose
19 we have to comment, as has been said before, he wasn't
20 asked to do, because he was only supposed to go back to
21 1970 anyway.

22 MR. POCH: Yes -- no, I --

23 MR. ROTHMAN: Well, Mr. Poch, in Exhibit
24 13, which is the September, 1988, long-term economic
25 outlook, there is an entire section entitled,

1 'Industrial Structure.' It starts on page 23 and
2 continues through to page 34. And talks about the past
3 trends in industrial structure and what we see as our
4 reasons for the forecast of industrial structure.

5 As I indicated in my evidence-in-chief,
6 this extensive a discussion of industrial structure is
7 not contained in Exhibit 15, the 1990 long-term
8 economic outlook, but our views on industrial structure
9 haven't changed significantly from the discussion that
10 is contained in this Exhibit 13.

11 And in that, we do discuss what we see as
12 some of the reasons for past trends, and where we
13 expect them to continue.

14 Within the industrial sector in Ontario,
15 there are good data that go back only to 1970. There
16 are some data that go back a little earlier than that,
17 to 1960. But frankly, I don't trust them.

18 As I said, a few times, the share of
19 manufacturing in total output in Ontario has been
20 really quite stable over the past 20 years. It has run
21 within about 2 per cent of the share that it now has.

22 But if we look at the data that we have
23 available for the 1960s, there are two times when it
24 drops by five per cent in one year and then comes back
25 up by five per cent the next year. That makes me

1 believe that those data are not terribly reliable.

2 Anyway, insofar as we can go back to 1970
3 and do that analysis, we have done some. We have not
4 done it at in the way that Dr. Buja-Bijunas approached
5 this analysis of electricity intensity, but we have
6 done some analysis. And, at least, some write-up of it
7 is contained in the reference I gave you.

8 MR. D. POCH: Q. I will have a look at
9 that.

10 Going back to our discussion of
11 electricity output ratios, they can change quite
12 significantly within a single industry, as a result of
13 a process technology change, or a product mix change,
14 Doctor?

15 DR. BUJA-BIJUNAS: A. That's right, yes.

16 Q. All right. And Mr. Rothman, if I
17 could ask you, since you are the one who does these
18 sort of input/output forecasts for the industry, do you
19 explicitly track the impacts of these effects within
20 the industry - product mix changes, process technology
21 changes - in your estimates of the electricity output
22 ratios for these industries?

23 For example, do you take into account the
24 trend towards higher value-added products, which have
25 less need for materials and energy, as distinguished

1 from the impact of changes in the process technology,
2 or energy efficiency, or interfuel substitution, when
3 you are doing those industry forecasts?

4 MR. ROTHMAN: A. I find that a confusing
5 question, Mr. Poch. Let me see if we can sort it out
6 to something that I can answer reasonably well.

7 You talked at the beginning of the
8 question about forecasts of electricity to output
9 ratios. This unit does not pay attention to those, to
10 that. That is really Dr. Buja-Bijunas' bailiwick.

11 Then you started talking about production
12 technologies and product shifts, within particular
13 industries. That is something we do pay some attention
14 to.

15 But because it is difficult to forecast
16 that over long periods of time, it would tend to affect
17 the shorter term forecasts.

18 Q. Okay. Well, that is helpful.

19 Move on, then, to --

20 DR. BUJA-BIJUNAS: A. Could I add a few
21 points to that, if I may?

22 Q. If you must.

23 A. In actual fact, we do have some
24 long-term impacts for things like the physical unit
25 forecasts, the actual commodity produced. Those

1 forecasts contain, in them, assumptions.

2 For example, for the pulp and paper
3 industry, that we would be tending towards the higher
4 value-added product, so as to maintain market share
5 because of the erosion of our market in the lower
6 commodity grade of newsprint, and things like that.

7 So, the long-term physical unit forecasts
8 do, in fact, incorporate some of these considerations--

9 MR. ROTHMAN: A. In fact, let me just --

10 DR. BUJA-BIJUNAS: A. --towards the type
11 of product produced.

12 MR. ROTHMAN: A. Let me just point out:
13 Our physical unit forecast document itself has four
14 pages on the chemicals industry, sort of to open at
15 random, and has headings like ammonia, chlorine,
16 ethylene, nitrogen, oxygen, sodium chlorate; and those
17 are the physical units which we forecast.

18 And there is some discussion in each of
19 these about where we would expect them to go. As one
20 example, just reading from the chlorine statement:

21 "The production of chlorine may not
22 decline as much as indicated by the
23 environmentally-softened market demand.

24 "Chlorine is co-produced with sodium
25 hydroxide for which the market is

1 strong.

2 "Chlorine is also used in the
3 production of other chemicals by the same
4 firms which produce chlorine."

5 And it is just an indication of the level
6 of depth that we get to in this physical unit forecast.

7 This document, the physical unit
8 forecast, has been filed with several interrogatories,
9 one of which, at least, I mentioned in my direct
10 evidence, the number of which I don't, offhand,
11 remember. Actually, I could probably find it, since
12 I....

13 Anyway, --

14 Q. I don't need it, and if you want to
15 provide it later for others, it may be helpful.

16 I wanted to turn to another area, and
17 that was how you deal with government policy.

18 THE CHAIRMAN: Perhaps you could clarify
19 what you mean by government policy. That is a very
20 broad area.

21 MR. D. POCH: Yes, and I think, perhaps,
22 if I may, Mr. Chairman, we will try to deal with some
23 specific examples to lend some shape to that.

24 Q. I noticed, before the Select
25 Committee in 1988, and this is in Exhibit 111, which we

1 have provided.

2 THE CHAIRMAN: Well, if you are going to
3 ask them how they forecast, whether their forecast
4 relates to government policy, do we have to go back to
5 all of this? Because why can't you be more specific
6 about what it is you are talking about, and ask them
7 how they plug it in?

8 MR. D. POCH: Well, Mr. Chairman, I would
9 like to examine what they do forecast and what they
10 don't. And --

11 THE CHAIRMAN: Well, can't you do that
12 without going to this? I haven't even looked at it,
13 but can't you do that without going to this?

14 MR. D. POCH: Well, perhaps I can,
15 without going to this, then.

16 Q. Mr. Rothman, you forecast all kinds
17 of government policy; is that fair to start?

18 MR. ROTHMAN: A. Explicitly or
19 implicitly, yes, we do.

20 Q. All right. And in 1988, you were
21 forecasting electricity growth, due to growth in GMP,
22 due to what you anticipated would be the case, that
23 would be that there would be a GST; is that right?

24 A. Yes.

25 Q. All right. And that was three years

1 before the GST was a reality?

2 MR. BURKE: A. My understanding of the
3 first time we included the impact of the GST into the
4 load forecast, and officially into the economic
5 forecast, was in the summer of 1989.

6 Q. Well, I am looking at the exhibit I
7 referred to a moment ago, Exhibit 111, at page N-144.

8 Mr. Rothman, you there said --

9 THE CHAIRMAN: Hold it. Just what page
10 of the exhibit?

11 MR. D. POCH: N-144, on page 4 of the
12 exhibit.

13 MR. BURKE: I think, Mr. Poch, that I
14 could save you some time on that, by saying that I
15 think there was a forecast that the GST would come in,
16 which since then, there were several periods in which
17 the economics group decided it was less likely, given
18 the opposition to it and it came back again.

19 MR. D. POCH: Q. Let me just --

20 MR. BURKE: A. From the point of view of
21 the load forecast, it was only introduced into the load
22 forecast for the first time when I suggested.

23 Q. All right. Mr. Rothman, your answer
24 there, in 1988, on August 4th, 1988, was:

25 "We have to forecast all kinds of

1 government policies. As one example, in
2 our last forecast, we forecast that there
3 would be an impact on the inflation rate
4 in Ontario by the implementation of the
5 federal sales tax reform."

6 MR. ROTHMAN: A. The next sentence:

7 "We have also reassessed that
8 probability."

9 Q. That probability. Okay.

10 THE CHAIRMAN: Am I reading that
11 correctly, that relates to the short-term forecast; is
12 that right?

13 MR. ROTHMAN: It would have been a
14 short-term impact as it ultimately was, but as Mr.
15 Burke points out, we took it back out again on the
16 basis that it was, at that point, premature, the sales
17 tax part.

18 The federal sales tax reform turned out
19 not to be as early as we had then been forecasting.

20 MR. D. POCH: Q. All right.

21 MR. ROTHMAN: A. And, from the context
22 again, the next paragraph starts on a longer-term
23 basis.

24 Q. All right. And you go on to say you
25 have to forecast monetary and fiscal policies that the

1 Government of Canada will be pursuing.

2 You did the same with free trade. You
3 tried to estimate its impact, before it was a reality
4 or a certainty. We have been referred to an exhibit
5 that was produced before free trade was --

6 A. Yes, we estimated its impact after
7 the agreement was negotiated.

8 Q. All right.

9 A. But before it was implemented, that's
10 correct.

11 Q. Right. You have already given
12 evidence, both of these, GST and free trade, you
13 anticipate in the longer term, will improve GDP, and
14 thus lead to a electricity demand increase, fair?

15 A. Will improve GDP, yes.

16 Q. And you are not forecasting anything
17 with respect to the Mexican free trade proposal right
18 now?

19 A. We don't have anything to forecast
20 now.

21 Q. Is it likely that if it comes to be,
22 we are going to see some shift of sourcing in
23 fabrication to Mexico and a reduction in the GMP here?

24 A. I don't want to speculate on that at
25 this point.

1 Q. What are you forecasting for uranium
2 mining in Ontario, as a result of --

3 Well, what are you forecasting for
4 uranium mining, first of all?

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1 [12:54 p.m.] DR. BUJA-BIJUNAS: A. Basically, Rio
2 Algom and Denison Mines had cutbacks back in 1990, and
3 we are expecting further shutdowns in 1993, leading to
4 further decrease in production. And that continues on
5 until about the turn of the century, after which there
6 is an increase in production.

7 Q. So you didn't catch -- you didn't
8 forecast that Denison shut down, as we were told this
9 week it is doing.

10 A. I have here that Rio Algom and
11 Denison Mines had cutbacks in 1990, and are expected to
12 have further cutbacks in 1993. So, it is a decrease in
13 production of uranium.

14 Q. But not a complete shutdown at
15 Denison.

16 MR. ROTHMAN: A. Again, to quote from
17 the physical unit forecast document, filed with the
18 interrogatory, which I will get the number of soon:

19 "Rio Algom announced the closure of
20 two mines, 80 per cent of total capacity
21 for August 1990, and Denison announced a
22 40 per cent shutdown for mid-1990. More
23 Denison cutbacks are expected around
24 1993, when the Japanese contract expires.

25 "Given the low quality of Ontario's

1 known reserves, exploration patterns, and
2 the availability of supply elsewhere, a
3 rebound is not expected for the Ontario
4 industry this decade."

5 Q. And you didn't make any forecast of
6 what Ontario Hydro was going to do about its uranium
7 sourcing, as part of that, did you? I understand it
8 might have been a sensitive thing to forecast.

9 A. Well, we said:

10 "The main domestic consumer has been
11 Ontario Hydro, with exports accounting
12 for a significant porportion of Ontario
13 production. These export contracts are
14 scheduled to expire in the next few
15 years, with little likelihood of
16 renewal."

17 Q. Now, Doctor...

18 A. There is a chart that shows --
19 actually, there is a table, I think. No, there is a
20 chart on page 22 of that document that shows output,
21 and there is a table on page thirty...

22 Q. Well, Mr. Rothman and Dr.
23 Buja-Bijunas, given the fact that Denison is shut down,
24 do you think that your estimates might have been a bit
25 high on the uranium picture. Hindsight is 20/20?

1 DR. BUJA-BIJUNAS: A. Yes. I would have
2 to look -- if you look directly at the fact that you
3 have less physical production, certainly there would be
4 less electricity used. As far as how much uranium
5 mining contributes to industrial consumption, I would
6 have to look that up. It may not be a significant
7 amount at all.

8 Q. I don't need to know that now. Okay.

9 MR. ROTHMAN: A. Mr. Poch, there in the
10 table, again, on page 30 of the physical unit forecast
11 document, it has uranium production in 1989 at just
12 under 4,000 tonnes, and the forecast for 1993 is about
13 a thousand tonnes, and just under that in 1994.

14 So, it forecasts a cumulative 75 per cent
15 reduction in uranium production between 1989 and 1993.
16 I don't know, without looking further, whether or not
17 the current announcements make that obsolete or --

18 Q. Make that a deeper cut or not.

19 Okay. Fair enough.

20 DR. BUJA-BIJUNAS: A. Currently, uranium
21 mining accounts for under ten per cent of mining
22 electricity use. So it would be a portion of a
23 portion.

24 Q. I'm not suggesting this is
25 necessarily a big factor. I'm just looking at the way

1 you captured these kinds of forecasts, some of which
2 are very directly influenced by government policy.

3 And, Doctor, you spoke earlier, I think
4 last week, about one of the factors in the commercial
5 sector load going up. That there would be -- your
6 assumptions with respect to hours of operation. Were
7 you referring to the question of Sunday openings there,
8 Sunday closings?

9 A. When we put together that estimate of
10 increased utilization, one of the variables we used was
11 increased hours of operation. And it does turn out
12 that by the year 2015 that increase is equivalent to
13 one additional day of operation, like eight hours.

14 Whether that is extended hours during the
15 week, openings until, say, seven o'clock, or whether it
16 is Sunday openings, we weren't explicit about that. It
17 is just an extension of business hours.

18 Q. Given the recent direction, at least
19 so far, to foreclose Sunday openings, is that going to
20 affect your forecast?

21 A. As I said, the extended hours are
22 based on general extended opening trends, not just
23 Sunday opening.

24 Q. So, you are not going to make an
25 explicit adjustment for that?

1 A. No. It is also -- I must also
2 indicate that that increase is by the year 2015, of an
3 additional eight hours.

4 Q. I guess, just to jump to the bottom
5 line here, what I'm concerned about is that there seems
6 to be some attempt on your part to forecast economic
7 changes that may or may not come about because of
8 announced government policy direction - as we saw with
9 the GST and free trade and so on - before these things
10 are realities.

11 But we haven't seen an attempt made for
12 announced government policy direction, which tends to
13 lower electricity load, as in the case of a move
14 towards efficiency, which we have seen promised. I'm
15 wondering why you feel comfortable, on the one hand,
16 doing it. And when it is going to raise load, on the
17 other hand, you haven't done that?

18 MR. ROTHMAN: A. Mr. Poch, I think, you
19 know, we talked earlier about how we add-factored the
20 LISA model, and reduced its productivity forecast. And
21 I have said before in these hearings, and I said in my
22 evidence-in-chief, that one of the reasons for the
23 assumption of load productivity was that we thought it
24 likely that there would be some undefined kinds of
25 environmental regulations, for example, that would be

1 likely to lower productivity. That there might be
2 some -- that there might be threats to Ontario's
3 competitiveness that the models weren't capturing.

4 So, in that broad sense, there has been
5 some taking into account of likely government policies
6 that might lower, in that case, economic growth. And
7 I'd let Mr. Burke and Dr. Buja-Bijunas speak to the
8 question of whether there is some directional weight
9 given to government policies in the electricity usage
10 area.

11 Q. I'm sure I will have questions
12 arising out of that, so maybe if you could hold that
13 thought, we could touch upon that after the lunch
14 break. If that is acceptable?

15 THE CHAIRMAN: Take a break now then?
16 Take a break until 2:30.

17 ---Luncheon recess at 1:03 p.m.

18 ---On resuming at 2:32 p.m.

19 THE CHAIRMAN: Mr. Poch?

20 MR. D. POCH: Thank you, Mr. Chairman.

21 Q. When we left off, we were just
22 discussing making a comparison between the efforts you
23 make to forecast the implications of government policy,
24 and future government policy directions on the
25 economics, and my suggestion that there had not been a

1 dramatic measure of effort to do that same on such
2 things as environment and energy efficiency
3 regulations. And I think, Mr. Burke, you wanted to
4 expand before we got into that.

5 MR. BURKE: A. Well, let me just recap
6 here. If I recall correctly, and perhaps you can
7 remind me if that wasn't the case, what Mr. Rothman
8 talked about was the impact that was considered, of
9 environmental regulations on GDP?

10 Q. Yes, he did.

11 A. I think I will introduce this, and
12 perhaps Dr. Buja-Bijunas will give you some details,
13 but, clearly, the issue of government standards and the
14 extent to which they are included in the load forecast,
15 is a very concrete example of a government policy area.
16 And in my direct evidence, I indicated that we had not
17 attempted to forecast the effect of government
18 standards beyond 1994.

19 I said that that was because the
20 standards process, standard-setting process was slow
21 moving, and we had not a very good idea of where it was
22 headed. And that I pointed out that there was also a
23 double-counting affect that we would be vulnerable to,
24 because many of the electrical efficiency improvement
25 programs that Hydro is embarking on are areas that

1 could be covered by standards, either the first time
2 or, to a greater extent than they are today. And so we
3 would have to be careful in presenting our forecast to
4 make sure that that didn't occur. And it might seem to
5 be inconsistent in practice to have an assumption of
6 programs in place, or programs directed at certain
7 efficiency gains in one part of our forecast, at the
8 same time as we have extrapolated the impact of
9 standards in another. So, that was really about the
10 difficulty of doing this.

11 I think what I would like to have clear,
12 and this is where I think Dr. Buja-Bijunas can help us,
13 is to sort of review, sort of chronologically, what has
14 happened to standards in Ontario. That is, with the
15 passing of the Energy Efficiency Act in 1989, the
16 extent to which standards were, in fact, put in place
17 and the extent to which we have a sense of where they
18 are going, in the period up to the time in which we
19 prepared the 1990 load forecast.

20 From my description of the approval
21 process for that forecast, it is apparent that that
22 forecast was pretty well finalized by the end of
23 October, early November, when it went to the external
24 review committee, and in terms of analysis that we were
25 doing of the load forecast. And that it was roughly

1 around that same time that the Speech from the Throne,
2 from the new government, came down. In fact, if memory
3 serves me correctly, that was in early or mid-November
4 that we actually got the Speech from the Throne.

5 So, while there may have been some more
6 concrete intentions expressed by government, we have
7 not had a chance to incorporate what we would make of
8 those intentions into the 1990 load forecast. And we
9 might very well wish to incorporate such things into
10 the 1991 load forecast. But we have been fairly
11 preoccupied answering interrogatories and preparing for
12 this hearing, so that we have not really prepared
13 additional analysis of -- I mean, there is nothing I
14 can show you at this point, from the point of view of
15 what we would include in next year's load forecast,
16 based on an assessment of a stronger interest in
17 standards that the current Ontario government has
18 expressed.

19 Q. Doctor, before you get into the
20 discussion of how you have, in fact, incorporated some
21 of these standards, I'm going to suggest that we can
22 maybe structure this a little to get through it faster.
23 But first -- I will come back to you in a moment.

24 First, Mr. Burke, you refer to this
25 problem you have to deal with. You have to reconcile

1 your DSM targets with this government
2 regulation-induced efficiency, which is in the basic.
3 Am I correct in my understanding that one of the big
4 distinctions between standards and the kinds of
5 programs in DSM is that standards can achieve much
6 higher penetration levels?

7 A. That is right, as a proportion of the
8 new market.

9 MR. ROTHMAN: A. Well, just to comment
10 briefly on Mr. Burke's description of how we have
11 handled standards in the forecast, and say that it's in
12 keeping with what we have done with the other policy
13 studies. That is, we didn't do a study of the Free
14 Trade Agreement until there was an agreement to study
15 and a reasonable likelihood of its passage. We didn't
16 do a study of the effect of the Goods and Services Tax,
17 until there was legislation proposed and reasonably
18 close to implementation. And similarly, we have done
19 our work on incorporating standards, as the policy
20 becomes well enough defined to be able to do the work.

21 We are now -- I mentioned earlier that we
22 have had to add-factor LISA to take into account
23 environmental, potential environmental regulation in
24 the future. We are now in the process of working on
25 modifying LISA so that we can put those assumptions in

1 more directly.

2 It is an evolutionary process, Mr. Poch,
3 and I think it is not a correct reading of the process
4 to suggest that it is biased in favour of accommodating
5 assumed changes in government policy that would tend to
6 raise output and load, as opposed to those that would
7 tend to lower it.

8 Q. Was there an actual proposed GST,
9 with a rate and so on, in '88, when you were first
10 attempting to model it?

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1 [2:40 p.m.] A. No, and we didn't put it into the
2 load forecast. We just raised the inflation rate at
3 that point.

4 Q. And when you raise the inflation rate
5 that, of course, does impact on the various models and
6 trickle down through?

7 A. Actually, I think it doesn't impact
8 much. It impacts on some of the cost escalators.

9 Q. All right. Doctor, if you will
10 indulge me, I would like to just deal with this in two
11 discrete packages, one being government program
12 initiatives, as distinct from standards. Let me just
13 test if the answers that I have in interrogatories are
14 still current, then.

15 1.7.34, which is in the package, that
16 says, if there are standards...

17 It says, the '88, '89, and '90 forecasts
18 do not include the net load impacts of efficiency
19 programs already started by Ontario Hydro. And then it
20 says, if standards or building codes are considered to
21 be a program initiated by another agency, then the 1990
22 load forecast takes current regulations and known
23 future regulations into account as described in Exhibit
24 9.

25 DR. BUJA-BIJUNAS: A. That's correct.

1 Q. Then, you go on to talk about
2 programs. And I guess distinction there is between
3 programs and these other harder standard type
4 regulations and codes. And you refer us to Exhibit
5 1.7.50 for how they are captured or not. And so, if we
6 turn to 1.7.50, I can paraphrase this, it's -- 1.7.50

7 MR. BURKE: A. It's in the package?

8 Q. It's in my package, I hope it's in
9 yours.

10 Let me read it out because it's quite
11 brief. The question is how you estimate the amount of
12 electrical efficiency to be provided or supported by
13 agencies other than Hydro over the forecast period.
14 The answer is:

15 "The impact on the load forecast of
16 other government programs to influence
17 the consumption of electricity are quite
18 difficult to quantify. Currently, such
19 programs typically provide information or
20 training related to energy efficiency.
21 They rarely transfer significant
22 financial incentives to conserve to the
23 customer. The nature of existing
24 programs and the limited information
25 available on the evaluation of their

1 impacts does not permit quantification of
2 the amount of electricity that they have
3 already saved. Without such information
4 there is no basis upon which to estimate
5 how much they may save in future. No
6 impact other than the implicit
7 extrapolation of their past contribution
8 to load reduction is included in the
9 basic load forecast."

10 So again, making this distinction
11 between standards, codes and these kinds of programs,
12 is this still the case with programs?

13 A. This is the case with programs. And
14 I might add, that in order to be able to answer this
15 question, I felt it was appropriate that I contact the
16 Ministry of Energy to see whether they had some
17 estimates that we should be taking into account, that
18 we might have not taken into account in the past,
19 through oversight. And to my knowledge -- what I was
20 told was, no, there were no such estimates available,
21 for either the impact of past programs or the impact of
22 future programs, from the Ministry of Energy.

23 Q. Right. And just looking at Exhibit
24 1.7.28, we asked you there about efficiency in the
25 basic load forecast, and how that's changed in the 1990

1 from the '88 forecast, and you tell us it's captured by
2 the term 'natural conservation.' It was estimated for
3 the '88 load forecast; you did not do a separate
4 estimate for the '89 or '90 forecasts, but you
5 conclude, it is not anticipated that there would be a
6 significant change in the estimate obtained.

7 From that, can I conclude that your view
8 at the time of answering this interrogatory, in
9 February, was that we are not likely to see any
10 significant change as a result of the new government
11 directions in that program-related area, that is
12 captured in the natural and basic?

13 A. I think I was quite clear that the
14 new government's intentions are not reflected in the
15 1990 load forecast.

16 Q. Now, let's go to standards, a little
17 more concrete. You have indicated that you do capture
18 in the 1990 forecast some standards, and you use the
19 phrase, "Only those sufficiently advanced in terms of
20 impact and date of implementation were included."

21 That, amongst other places, appears in
22 Exhibit 16 at page 14.

23 Let me ask you, Doctor, my understanding
24 is the standards you have captured are: None in the
25 industrial sector; none in the commercial sector, apart

1 from those residential standards that impact on
2 multi-residential, which you categorize in your
3 commercial sector; and I think there are some five or
4 six in the residential sector, is that right?

5 DR. BUJA-BIJUNAS: A. That's correct.
6 When we were doing the forecast, for a number of months
7 before doing the forecast, we were in consultation with
8 the Ministry of Energy. And the individual who is
9 responsible for looking into the standards, and dealing
10 with the manufacturers, et cetera, at that point, he
11 indicated that potential standards for things like
12 fractional horsepower motors or electronic ballasts, et
13 cetera, were so vaguely defined, they still had no idea
14 whether we were talking implementation in 1992, 1994;
15 how extensive these standards would apply; that it was
16 very difficult to have quantify. He could not give us
17 any sort of estimation of the net impact. And
18 therefore, we left out anything if we didn't, at least,
19 have some idea what the standard applied to.

20 Q. When was that discussion, that
21 inquiry made by you?

22 A. The consultations underlying the 1990
23 forecast and, therefore, the particular standards
24 incorporated, are the result of discussions we had
25 during 1990.

1 Q. Obviously, prior to the publication
2 of the document.

3 A. Yes.

4 Q. And the discussion you just
5 mentioned, about standards being considered, but that
6 are still -- they couldn't put an amount and a date on
7 it, was that at the same time or subsequent?

8 A. We had subsequent discussions with
9 them, all the way up until about two weeks ago, where
10 they just now were saying, for example, for the motor
11 case, potentially they might have something by 1992,
12 which would only shave off the least efficient motors.
13 And so they looking, potentially, to 1994 before any
14 real impact.

15 Q. Who do you deal with at the Ministry?

16 A. Which individual?

17 Q. Is there one individual that you deal
18 with?

19 A. There is one particular individual.

20 Q. Who is that?

21 A. Ed Grzesik. I am not sure I have
22 pronounced his name correctly, but it's something like
23 that.

24 Q. That is fine. So it's been indicated
25 to you that there is an intention to move on those

1 matters, although they haven't been available to
2 provide with you any firm dates or firm --

3 A. The extent of applicability. Often,
4 for hot water heaters, for example, the size of the hot
5 water heater varies. In one discussion, it might be
6 for 40 and 60s; the other discussions, it might be
7 extended to 20s. We don't even know the range of size
8 that it applies to.

9 Q. And apart from the comment that's
10 been made that, intrinsically, you capture whatever
11 trend there has been, you have not made any specific
12 adjustment in your long-term forecast, as of yet, for
13 these proposals?

14 A. For things like motors, is that what
15 you are referring to?

16 Q. Standards for motors, standards for
17 whatever else is being considered.

18 A. No, we have not.

19 Q. And the ones you have included, the
20 five you spoke of, or will speak of -- the other day,
21 it was suggested that the inclusion of those is the
22 explanation for -- there was a difference in numbers in
23 EEMO forecast, in the pages 10 and 61 of the 1990 load
24 forecast, and the two numbers were 282.4 versus 284.6
25 terawatthours. Do you recall that discussion, Mr.

1 Burke?

2 MR. BURKE: A. Yes, and I also pointed
3 out where, in the report, you could find the difference
4 quite explicitly.

5 Q. Just, first of all, just taking that
6 difference, my calculation tells me that's about
7 7/10ths of one per cent in the long haul.

8 A. Yes, it is a very small effect so
9 far.

10 Q. I looked at page 6 of Exhibit 9,
11 which I have hunch is what you are going to refer me
12 to, talked about lowering peak by 335 megawatts in the
13 year 2015. That's comparable, then; that's just the
14 translation. And it is also about 7/10ths of one per
15 cent?

16 A. Yes, that's about right.

17 Q. And in Exhibit 16, which is the
18 residential discussion, at page 17, there is the number
19 2.37 per cent. I take it that must be just as a per
20 cent of residential load, then, because it's a higher
21 number?

22 DR. BUJA-BIJUNAS: A. It's a percentage
23 of residential load, as predicted by the end-use model.
24 So the EEMO residential forecast, and to the extent
25 they are different...

1 Q. But in fact, you are using the
2 end-use model predominantly in the load forecast?

3 A. Yes.

4 Q. Now, Mr. Burke, have you, in fact,
5 made an adjustment in the EEMO forecast? I appreciate
6 it didn't predominate in the load forecast.

7 MR. BURKE: A. In Exhibit 77, I believe
8 it's tables 1 and 2 of that report, show the effect of
9 taking out the estimate of the impact of standards from
10 the model-generated forecast. And that estimate of the
11 impact of standards was the same estimate derived using
12 the end-use model.

13 So, both models' results are presented in
14 Exhibit 9, in their respective chapters - I believe
15 they are Chapters 4 and 5 - on a consistent basis, in
16 that the residential for EEMO has subtracted out the
17 impact of standards in the residential sector, as
18 estimated though by the end-use system.

19 Q. And you are all consistent in your
20 '88 forecast, which underlined the balance of power;
21 it's not in there.

22 DR. BUJA-BIJUNAS: A. That's right.

23 MR. BURKE: A. There was no announced
24 standards whatsoever at that point.

25 Q. Right. Now, would you agree that

1 they are many possible government regulations that
2 could significantly affect energy efficiency that
3 aren't sufficiently advanced, but that are options
4 available to the government?

5 A. I would certainly agree with that,
6 yes.

7 Q. And the ones you do capture are
8 listed in Exhibit 1.7.59?

9 DR. BUJA-BIJUNAS: A. The ones we
10 capture under the 1990 forecast go somewhat beyond
11 that.

12 Q. I'm sorry.

13 A. The response to 1.75.9 is the
14 underlying assumptions regarding the impact of
15 standards for the '89 forecast. At that point, there
16 were two regulations in place, which did not have very
17 much in the way of impact in the terms of electricity
18 consumption. Basically, what they did was eliminate
19 very few models from the entire production capability
20 for a given appliance, and so had very, very little in
21 the way of impact.

22 Q. In fact, from that comment, and from
23 the comment in the reply to 1.7.59, where you are
24 talking about refrigerator and freezer standards, you
25 say, a large portion of the current product line would

1 meet mandated standards. A similar comment made with
2 respect to ranges, washers, dryers and dishwashers.

3 Is it fair to say that the standards that
4 are concrete enough to be included at this point are
5 not particularly heroic standards?

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1 [2:55 p.m.] A. Oh, hang on a second here. The 1990
2 forecasts include a number of standards that try to
3 harmonize Ontario manufacturers with U.S.
4 manufacturers. Incorporated in that, for example, are
5 standards whereby refrigerator efficiencies improve by
6 45 per cent by 1994. I think that is a significant
7 amount.

8 Q. All right.

9 A. So, 1.7.59 gives the picture for the
10 '88/89 forecast, and quite a lot has been done since
11 then, for the 1990 forecast.

12 Q. Okay. And in the '90 forecast,
13 there's no standards for the commercial sector, I take,
14 it, apart from those you spoke of?

15 A. Apart from multi-res, yes.

16 Q. All right. And similarly, none for
17 the industrial sector?

18 A. That's correct.

19 Q. All right. Have you done a scenario
20 where you postulate, sort of, a very aggressive,
21 wide-ranging, multisectoral government program,
22 including efficiency regulations and building code
23 improvements, things such as that, and to see where it
24 can get us?

25 MR. BURKE: A. Yes. We were -- well, I

1 shouldn't say 'we' in the sense of the load forecast
2 department, but the division was asked, along with our
3 usual colleagues, the Energy Management Branch and
4 system planning, to look at a potential for standards
5 kind of scenario, around the time of the Speech from
6 the Throne.

7 That is, a request was received for the
8 end of October, early November, some time in there, for
9 an estimate of what the impact of standards could be.
10 And given the time that we were given, as a group, to
11 come up with the result, the work that was done
12 essentially looked at the potential for electrical
13 efficiency improvement that we had identified before
14 applying the penetration rates for the programs.

15 And in areas where it was thought that
16 standards could perhaps be applied - and I wouldn't
17 claim that it exhausted all areas where standards could
18 be applied - I mean, it is just sort of conventional
19 where, you know, standards are conventionally applied;
20 that is, in appliances and new housing and so on - that
21 we did estimate what the impact would be, essentially
22 of raising the penetration rates from those that were
23 in the electrical efficiency improvement projection to
24 those that the standards would bring about, and --

25 Q. Just --

1 A. So, but essentially then, setting the
2 standards implicitly at what is economically viable, in
3 the same way as we looked at the electrical efficiency
4 improvement programs.

5 Q. A couple questions then. First of
6 all, the potential - that is, the potential induced you
7 talked about, about which you are now talking about
8 standards as a way to increasing penetration to the
9 marketplace - that is a potential you have calculated,
10 assuming the costing methodologies that underlie the
11 balance of power?

12 A. Well, I think now we are getting into
13 the substance of the numbers, the potential, which are
14 the object of Panel 4.

15 Q. We can leave that. That is fine.
16 Okay.

17 MR. B. CAMPBELL: I can tell you, Mr.
18 Poch, my recollection is that there is an interrogatory
19 that has touched on this area, and we will sort of
20 capture this. And I am sure it will be of great
21 interest in Panel 4.

22 MR. D. POCH: Thank you.

23 Q. And very briefly then, right now you
24 are showing a target of 2,000 megawatts for 2000, and I
25 think your latest potential number is something over

1 6,000?

2 MR. BURKE: A. Yes.

3 Q. How much did standards move us up -
4 the standards you have just spoken of, the kind of
5 ordinary standards, you have spoken about?

6 A. Well -- okay, I can give you a rough
7 estimate.

8 Q. Yes, very rough. I appreciate that.

9 A. It would be roughly half the way,
10 between the 2 and the 6--

11 Q. Okay. So, you get a sort of--

12 A. --because there are some --

13 Q. --in around 4,000 received?

14 A. Yes, and that reflects the idea that
15 there are some areas in which it was very difficult to
16 create standards. And it also reflects the view that
17 standards take a long time actually to set. You cannot
18 set them very quickly.

19 And we are talking about the year 2000 in
20 the numbers we are choosing here, and in practice,
21 standards, at the rate we are moving to setting them,
22 we will be lucky to have a comprehensive set in place
23 by 1995.

24 Q. Okay. And so, if we go out farther,
25 we will have longer for standards to take hold, but of

1 course, correspondingly, you would have had longer to
2 obtain penetration in the marketplace in the program
3 load, too?

4 A. Yes, so there would be more to
5 offset, by way of implicit savings that we are already
6 taking into account.

7 Q. Okay. I sense then, Doctor, that the
8 Ministry has expressed some difficulty to you in being
9 able to quantify what can be done and so on.

10 Have you been able to lend them any
11 assistance in that regard?

12 DR. BUJA-BIJUNAS: A. I haven't been
13 assisting them; they have been assisting me.

14 Q. Okay.

15 A. I would like to point out, they are
16 doing a significant amount of work. Every time I do
17 meet with them, there has been quite an extensive
18 effort on the part of discussing the possibilities of
19 manufacturers being able to deliver a given product by
20 a certain time frame, but it seems to be an inherently
21 difficult task for them.

22 Q. Sure. Okay. Well, perhaps we can
23 hear more of that later, from you or from them.

24 Before moving into the discussion about
25 market share fuel choice, I would like to just cover up

1 a couple of miscellaneous points.

2 If we can have slide 18. This is from
3 Exhibit 107, page 18, and it is the International
4 Comparison of Electricity Intensity.

5 I think both Dr. Buja-Bijunas and you,
6 Mr. Burke, have expressed some reticence in looking to
7 international comparisons. I know you have noted there
8 can be any number of underlying differences in the
9 economy or climate, lifestyle, of the different
10 countries.

11 Accepting that that is the case, can we
12 not, nevertheless, from such a comparison, draw out a
13 few broad conclusions? And just looking at that graph,
14 isn't it fair to say that, even accounting for
15 structural and climate differences, when you see
16 Canadian electricity intensity at four times that of
17 the Japanese or the French, isn't it fair to say that
18 we are not the most efficient of economies?

19 MR. BURKE: A. You know, it is a
20 judgment. I really don't think you can observe
21 anything from this at this stage. There are really too
22 many factors that could make quite a difference.

23 The scale of pricing between some of
24 these countries is dramatically different. A mix of
25 industries -- there are just too many factors to draw

1 simple conclusions from this information.

2 Q. And I see the Japanese, in
3 particular, has been trending down for some time. Are
4 you familiar enough to comment whether there has been
5 some escalation in price there, or --

6 A. Well, I don't know. The trend you
7 are seeing in your own plot essentially starts down, if
8 it is down, from the mid-'70s.

9 Q. Yes.

10 A. And essentially, I would hazard a
11 guess that it is no more than that; that because the
12 electric sector in Japan was heavily dependent on
13 oil-fired generation, and the price of oil went up
14 significantly, that that would have been a major
15 motivator for electrical efficiency improvement in
16 Japan, which led to price increases in many
17 jurisdictions that were substantially higher than the
18 25 or 30 per cent that we experienced in '76, '77, and
19 makes what we experience look tiny.

20 Q. All right. The Japanese economy
21 doesn't appear to have suffered. You needn't comment.

22 Just in fairness, this graph ends at '85.
23 If we were to extend the Canadian line, I take it it
24 would start to come down a bit, drawn down by the
25 Ontario experience?

1 A. Sorry?

2 Q. This graph cuts off - the OEC data
3 cuts off at '85.

4 If we were to extend this out to 1991,
5 would you expect that the Canadian line would start to
6 trend down, dominated, as the Canadian economy is, by
7 the Ontario scene, as you have told us?

8 A. Well, I think what I have told you is
9 that the intensity has averaged about one in the last
10 15 years. And I would think, if we are looking at 85
11 to '91, it also would have averaged pretty close to one
12 in that period. I wouldn't expect Ontario to be
13 bringing this down much.

14 Q. Okay. Now, Doctor, I had a question
15 to you about some assumptions about end uses and I just
16 wanted to get a little better feel for how you deal
17 with the office sector.

18 You could turn that off. I think it
19 would save a kilowatthour or two. It would save Mr.
20 Rothman's eyes at least.

21 You have noted quite a strong growth.
22 You are anticipated quite a continued strong growth
23 trend in energy consumption of the office equipment.

24 DR. BUJA-BIJUNAS: A. That's correct.

25 Q. And I have heard the phrase "plug

1 load." I take it that that is the --

2 A. Things that you plug in.

3 Q. Things that you plug in.

4 A. Things like PCs, et cetera.

5 Q. What have you assumed for the trend
6 in PCs? Is there a trend towards the portable, the lap
7 top variety, that we have seen emerge in the last few
8 years?

9 A. What we have assumed, basically, is
10 an increase in the number of PCs per employee. That is
11 detailed--

12 Q. Yes.

13 A. --in, I think, Exhibit 17.

14 Q. Yes. You did speak to that.

15 I am just wondering for the efficiency of
16 the product, what have you assumed?

17 A. The efficiency of the product, we
18 have assumed to be essentially constant; the same as it
19 is now. The reason we did that was an implicit
20 assumption buried in there that -- we are not saying
21 that the PC will be less efficient 20 years from now
22 compared to what it is now, but that there will
23 probably be other uses similar to PCs that this
24 variable is trying to capture.

25 Q. In fact, if we just look at PCs,

1 these laptops are far, far more energy efficient than
2 the portables?

3 A. Yes. I am not saying that another PC
4 20 years from now would be the same efficiency as the
5 ones we have now. That is not the consideration.

6 Q. All right. And do you have a feel
7 for what the scale of the wattages of those two types,
8 laptop and desktop?

9 A. I don't know what the relative scale
10 is.

11 Q. And with respect to computer printers
12 and laser printers, in particular, I assume that is a
13 relatively large draw?

14 A. That's right.

15 Q. All right. Have you made any
16 forecasts of the trend towards networks where people
17 can share one?

18 A. I think there is an assumption
19 somewhere about how much networking there would be, or
20 the relative number of mainframes versus minis versus
21 terminals versus PCs, that sort of thing.

22 Q. But the relative number of PCs
23 wouldn't -- none of that would capture this particular
24 item of a sharing of a printer, would it?

25 A. I would have to go back to the

1 analyst and all his underlying files to find out
2 exactly how much of each was incorporated.

3 Q. Okay. All right. Could you just
4 tell us what the ratio of these, you know, laser
5 printers to PCs is, how that has trend?

6 A. I would have to go back to the
7 analyst to get all his files.

8 Q. All right. Okay. Just that ratio,
9 if you could ask that, and if it is not too difficult.
10 And, please, if it involves days of digging, do come
11 back and we will, no doubt, excuse you from that.

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1 [3:10 p.m.] MR. B. CAMPBELL: Don't worry.

2 MR. D. POCH: Q. Now, I assume you have
3 also got something in there for fax machines and
4 copiers, continued penetration in those forms?

5 DR. BUJA-BIJUNAS: A. That is correct,
6 yes.

7 Q. What have you assumed for the new
8 technologies like fax cards and integrated laser copier
9 fax machines, where we, basically, do away with the fax
10 machine?

11 A. I'm not sure what the underlying
12 assumption is for those particular examples.

13 Q. Could you inquire about that,
14 generally, for me?

15 A. Yes. Can I make a statement
16 regarding -- your underlying questions, regarding what
17 goes into here?

18 Q. Yes, go ahead.

19 A. If I may be allowed to.

20 We did make specific assumptions
21 regarding PCs and minis and mainframes, et cetera,
22 point-of-sale terminals, the sort of things you find in
23 grocery stores. There are a number of types of office
24 equipment that I recognize we did not capture. We
25 tried to get a feeling for the relative growth rate of

1 certain types of office equipment, based on what
2 government ministries, for example, were noticing, in
3 terms of number of these types of equipment per
4 employee, and how they see that going in the future.

5 That led to an estimation of an aggregate
6 office equipment growth rate, which we then cross
7 compared to other utilities, to other consulting
8 groups, to EPRI, people -- California Energy
9 Commission, Lawrence Berkeley lab, people who have been
10 looking at the growth of computer equipment and what
11 they expect in the future.

12 In addition, StatsCan did a study of
13 office equipment technologies, which they expect to see
14 in the future. And we put that all together to get an
15 aggregate office growth rate, which was well within the
16 bounds of the sorts of growth rates expected by these
17 other bodies. So we do not have a very, very detailed
18 set of assumptions regarding particular types of fax
19 machines, but we used more aggregate indicators of the
20 use of PCs and machines like that, and where they were
21 going.

22 Q. If you do it in aggregate, then, I
23 guess it is not easy to assume a saturation point,
24 because we don't know what those products are going to
25 be.

1 A. That is just it. When you are doing
2 a bit more aggregate level, you are trying to capture
3 inroads, by types of equipment which is not available
4 currently. If you try to enumerate them all, just the
5 way you did, you are probably not going to enumerate
6 quite a gamut of additional machines, which will be
7 coming on-line ten years from now, just as we've
8 witnessed historically.

9 So, we tried to get more of a feeling for
10 the rate of evolution and cross compared that to other
11 jurisdictions which have a strong commercial base, to
12 get an aggregate figure which makes some sort of sense.

13 Q. Doctor, if we could turn to another
14 item, in Exhibit 100, which was the collection of
15 overheads you referred to, in your evidence-in-chief,
16 at page 17 there is a discussion of pulp and paper, and
17 I noticed quite a different energy electricity
18 intensity of the TMP, thermal mechanical, and chemical
19 thermal mechanical, at 2500 kilowatt hours per tonne
20 to, say, recycle that, a tenth of that.

21 Are you aware that Ontario Hydro had a
22 special rate, specifically for thermal mechanical
23 pulping offered?

24 A. I think I was aware that they had
25 some sort of rate back in the '80s. I'm not sure

1 exactly to what extent it was picked up or where it
2 was.

3 Q. In doing it...

4 A. But I'd like to make the statement
5 that most of the inroads of TMP is very much driven by
6 the market. It is a quality of product which drives
7 the need for TMP, and industry would have to go to it,
8 regardless, if they want to stay competitive in the
9 market.

10 Q. Yes. I just appreciate that, but we
11 have heard, of course, a discussion that this industry
12 can locate here or it can locate elsewhere, so on.

13 I take it from your comment, then, you
14 haven't adjusted your rate of penetration in that
15 sector, having accounted for that special rate that it
16 was offered by Hydro? It just didn't enter into your
17 extrapolation.

18 A. What the end-use model starts out
19 with is the equipment which is installed right now,
20 assuming people don't throw out their equipment. So
21 the pulp and paper industry has a certain amount of TMP
22 installed. It has a certain number of business plans
23 saying where they are going to go with TMP
24 installations, and a natural evolution of TMP, as the
25 technology of choice to produce high-grade newsprint.

1 Q. Are you aware if Ontario Hydro's
2 given any special rate to recycling? Well, I'm just...

3 A. I'm not aware of that.

4 Q. Nor am I. Okay.

5 Just in the iron and steel, at page 20, I
6 don't know if it appears on page 20, but you did --
7 yes, it does.

8 You did refer to this trend towards
9 electric arc furnaces.

10 A. That is correct.

11 Q. Are you aware of whether or not Hydro
12 has done any special R&D for electric arc furnaces?
13 Did it give any special support to that sector?

14 A. I know that they -- I don't know what
15 you mean by support. There has been R&D done for
16 things like scrap preheating, or other measures that
17 would make electric arc furnaces more efficient.

18 Q. Well, to be honest, I don't have
19 anything in front of me. My recollection is that there
20 was either R&D or rates to support, I think it was
21 called plasma arc. I'm wondering if you could just
22 inquire and get back to us.

23 MR. B. CAMPBELL: Aren't we getting --

24 a) we are getting a little speculative,
25 and b) I can -- I also know that if there is likely to

1 be a panel that has any knowledge of this in any
2 particular detail, it would be Panel 4, because to the
3 extent that there were any such programs, they are
4 carried out under the auspices, I believe, of the
5 energy management branch.

6 MR. D. POCH: Fine.

7 MR. B. CAMPBELL: And there will be
8 representatives on Panel 4. That said, I'm not at all
9 clear on where this is going. I will have to deal with
10 it in the questions at that time.

11 MR. D. POCH: That is fine, Mr. Campbell.
12 I will hold off on questions of whether or not there
13 were, and how dramatic it was, to that panel.

14 Q. But I take it, for the purposes of
15 this panel, for the load forecasting exercise, there
16 was no account taken of such a practice or rate? You
17 are unaware of it, so obviously, it didn't get
18 incorporated.

19 DR. BUJA-BIJUNAS: A. I'm unaware of it,
20 so it would not have been incorporated.

21 Q. All right, I'd like to turn to a
22 question of fuel choice and market share.

23 To begin with, we have heard a lot about
24 elasticities. I was intrigued to see, in a paper that
25 we have -- that was presented by Ontario Hydro that we

1 have included in our package, as Exhibit 112, that in
2 surveys of, at least, electricity price elasticity -
3 tell me if I have interpreted this correctly - there is
4 quite a range, just turning to the last page of that,
5 of calculated elasticities, as measured in different
6 jurisdictions and by different researchers and so on.

7 MR. BURKE: A. Before you draw too much
8 of an -- you can draw the implication that there are
9 certainly quite a range of elasticities that have been
10 estimated over time and various jurisdictions, and
11 under various circumstances, and that are summarized --
12 the results of which are summarized here.

13 But, I would like to point out to you
14 that, while this report has a date on it of a
15 presentation in 1987, review by Ontario Hydro, the
16 review is not done in 1987, the review was presented as
17 an exhibit as, in fact, you can see from the way the
18 pages are set out. This was an Exhibit 2.1.17 to, I
19 think, a 1986 OEB hearing. I think the work was done
20 in 1985 or '86.

21 If you look at the study years that are
22 presented in the survey, I do not believe there is a
23 result from a study that was published after 1983.
24 And, inevitably, when studies are published, the data
25 that are used to prepare the estimates are, in fact,

1 several years older than that. So that I don't think
2 there is an elasticity estimate here that includes the
3 data from the 1980s.

4 Q. Okay, can you tell me then, is it
5 your feeling that there is more consensus now on what
6 the elasticity is in this area?

7 A. My feeling is, I think in response to
8 Mr. Rodger from AMPCO's questioning about the use of
9 different kinds of modeling techniques, is that less
10 and less activity in the econometric area for
11 electricity demands has --

12 There has been less and less econometric
13 modeling of electricity demands across North America in
14 the last ten years, as end-use models have tended to
15 take over the forecasting activities of most utilities.

16 However, I am interested in what people
17 who do this get, and so we have been in touch with some
18 of the utilites that are actively still involved in
19 this, and the Tennessee Valley Authority, for instance,
20 and Bonneville Power, which I mentioned as one of the
21 few major utilites that still maintain both types of
22 modeling capability, have done sort of elasticity work.
23 And do end up with estimates that are very similar
24 indeed to ours.

25 Bonneville Power residential long-run is

1 minus .3, and Tennessee Valley Authority residential
2 long-run is minus .5. I think ours is minus .5.

3 Essentially, we have surveyed the
4 literature, in preparation for these hearings, to try
5 to understand whether there has been a change in
6 perception, and what we have found is that there are
7 very few newly-estimated elasticities to choose from.
8 And so these ones that I mention, which are fairly
9 current, for these other utilities, are actually some
10 of the few that we have been able to find that are in
11 the same class with ours.

12 Q. Mr. Burke, please understand, I'm not
13 trying to suggest that there isn't an elasticity here.
14 I just wanted to get a sense about how much certainty
15 there is about that elasticity?

16 A. Well, my sense is that comparing
17 elasticities is pretty close to the same sort of
18 problem you get in terms of comparing electricity
19 intensities between countries. Circumstances differ
20 vastly.

21 And really, apart from the fact that
22 there is a range, which I agree that you could conclude
23 from this information, I'm not sure what it implies
24 about whether our elasticity for Ontario is correct or
25 not correct.

1 Q. I take it we could make that same
2 comment about comparing demand management targets or
3 potential internationally, too?

4 A. Well, it is difficult to compare.
5 The thing that you can do with demand management
6 potentials, is you can get to a technology-specific
7 level and see whether the technologies that people are
8 talking about, in a particular end-use, are comparable.
9 And once you are doing that, you can start to compare
10 likes with likes.

11 Q. Now I take it, then, we shouldn't
12 assume that this study gives us any kind of statistical
13 indication of the uncertainty in the elasticity, but
14 you'd agree there is some uncertainty in the
15 elasticity.

16 A. Well, as a matter fact, we have an
17 estimated uncertainty in our elasticity, and I don't
18 have the standard error of it with me, but actually it
19 would be tricky to get, come to think of it, because it
20 is a simulated elasticity from the two equations in the
21 residential model, but certainly there is uncertainty.

22 Q. Yes. And can we draw, as a
23 conclusion from that, that choosing a price approach --
24 if we wanted to induce conservation, and we had a
25 choice between inducing it with price, or going out and

1 buying the light bulbs and giving them away, that this
2 uncertainty in elasticity would indicate that there is
3 more certainty in a program approach, to the extent
4 that we get penetration?

5 A. I don't think so at all. I think the
6 issue is very much that the penetration rate of
7 programs is highly uncertain. We have no idea,
8 particularly, what the standard error on our
9 penetration rate estimates are.

10 Q. Just on the price point, have you
11 done any scenarios of different pricing strategies and
12 rate structures, which I assume also affects this, to
13 see what could result with somewhat more dramatic
14 changes in pricing or rate structures?

15 MR. B. CAMPBELL: I am sorry, just a
16 minute. Just so that I'm clear on the question, you
17 are talking simply structure, not overall changes to
18 how you arrive at the revenue requirement? That is the
19 total level?

20 MR. D. POCH: I'm talking about both.

21 MR. B. CAMPBELL: Well, that wasn't what
22 you had asked.

23 MR. D. POCH: I thought I had said
24 pricing levels. If not, let me correct my question.

25 Q. Have you done scenario analysis to

1 look at both, either in combination or separately, of
2 different assumptions for the future, for the level of
3 price or the rate structure, changing in more dramatic,
4 more dramatically than...

...

1 [3:25 p.m.] MR. BURKE: A. Let me deal with the
2 level first. In response to several interrogatories
3 about what would be the impact on load, and we had one
4 interrogatory that asked you to enumerate 1, 10, 17,
5 36, 200, whatever, different increases in price,
6 we simply gave the elasticity as the response,
7 essentially, to say that in the long run, the best
8 information we have is captured by that elasticity.

9 We warned people against using elasticity
10 for large price increases, as we repeated that concern
11 in our direct evidence, because we do not have a lot of
12 experience in Ontario with large price increases. And
13 I think it would only be prudent not to assume that you
14 could extend this elasticity too far.

15 There is a point that you are raising
16 here that I would like to just address, and that is,
17 have we looked at sensitivity? Sort of, as if we
18 hadn't, there is some problem with that, because given
19 the elasticity information, unless there is a
20 particular objective that we would like to look at --

21 You know, we don't particularly just spin
22 the models to see what the results are. We have a
23 sense of the price elasticity and, if there is some
24 particular question that people have in mind about what
25 would a certain price increase do, then we are in a

1 position to answer it. But simply to print out a
2 series of, this is what the model gives, at this and
3 that price increase, isn't too useful for us.

4 Q. I recall at the time of the
5 demand/supply planning strategy exercise, which was the
6 precursor to the balance of power, that there were some
7 representative plans.

8 A. Yes.

9 Q. And I believe at least one of them,
10 perhaps more, were -- I think there was 16, I'm told, I
11 am informed there was 16, and that two of them were
12 called all-price scenarios.

13 A. Yes.

14 Q. Have you brought those forward? Are
15 they available, calibrated to the reality we are at in
16 1991?

17 A. I don't believe that plan has been
18 included in the group of plans that are -- but maybe
19 you should ask the planners on the status of that
20 particular plan.

21 Q. Okay. Now, you have noted that there
22 is not a tremendous amount cross-price elasticity
23 between gas and electricity, you have told us there are
24 offsetting elasticities in the different sectors, but
25 that, even in a given sector like residential, I think

1 your evidence was that non-price factors were dominant;
2 is that fair?

3 A. I am not sure I said dominant, but
4 certainly non-price factors have a large role to play
5 in determining the historical market share.

6 Q. Marketing could be one?

7 A. I really can't comment on that.

8 Q. All right. Are we talking about
9 market barriers, like the famous landlord/tenant split
10 where somebody has a --

11 A. That applies I think in the co-rented
12 accommodation in the commercial sector, but I am not
13 sure. I think the sorts of things we are talking about
14 are convenience, sorts of issues to do with availability
15 that we discussed; you know, room by room control; low
16 front end capital costs.

17 Q. Let's stop there, low front end
18 capital costs...

19 A. You see, that's not captured by a
20 cross-price elasticity. It may be captured in a market
21 share model that looks at capital and operating costs
22 together.

23 Q. Would you agree that to the extent
24 the cross-price elasticity is lower because of various
25 non-price effects, that to the extent we can address

1 those non-price issues and programs -- sort of the
2 lower the cross-price elasticity, the more potential
3 there is for demand side management. I have lost you.

4 A. You have. What kind of demand side
5 management did you have in mind?

6 Q. Well, Mr. Burke, if I am prompting
7 questions from you, I think I am going leave that aside
8 for the moment.

9 Mr. Chairman, if you wanted to take and
10 afternoon break, this is a convenient time.

11 THE CHAIRMAN: All right. We will take a
12 break now, 15 minutes.

13 ---Recess at 3:30 p.m.

14 ---On resuming at 3:47 p.m.

15 MR. D. POCH: Q. Just before we get into
16 market share, Mr. Burke, I had asked you about the
17 relative certainty of relying on price mechanisms,
18 given uncertainty in elasticities and programs. And
19 perhaps I should have asked you, what is the relevant
20 uncertainty of price mechanisms, given the
21 uncertainties you have spoken of, and things like
22 standards?

23 MR. BURKE: A. As we discussed before,
24 the difference between programs and standards is that
25 you can rely much more on the complete take-up of the

1 more efficient equipment in the new market that's
2 regulated by the standard. That's quite different from
3 the uncertainty associated with program penetration
4 rates.

5 Q. And I take it, it's different again
6 from the uncertainty with price-based mechanisms.

7 A. I wouldn't want to try to get into
8 relative uncertainties here.

9 Q. Fair enough. I would like to touch
10 on the question of market share. And included in the
11 package of materials, graphics, and related materials,
12 which is Exhibit 107, were a couple of pages reproduced
13 from Exhibit 89. They are pages 14 and 15 of this
14 exhibit.

15 Now, Mr. Burke, I have a hunch this is
16 for you, but perhaps it's for you, Dr. Buja-Bijunas.

17 I recognize this is work done by Mr.
18 Torrie, and he hasn't had a chance to speak to this
19 evidence yet, so I am specifically going to avoid
20 asking you to adopt any of the particular numbers in
21 any precise fashion.

22 THE CHAIRMAN: What page are we on?

23 MR. D. POCH: This is page 14 and 15 of
24 Exhibit 107, which is an excerpt, in fact, of pages 30
25 and 31 of Exhibit 89.

1 Does everybody have that?

2 THE CHAIRMAN: Yes. Remind me who Torrie
3 Smith Associates are, first of all.

4 MR. D. POCH: Torrie Smith is a
5 consultant for the Coalition, and this is part of a
6 piece of evidence that was filed.

7 THE CHAIRMAN: What you intend to is
8 refer them to a piece of this and ask them if they
9 agree or disagree?

10 MR. D. POCH: Yes, I just want to ask in
11 a general way whether they agree or disagree.

12 MR. B. CAMPBELL: We may be able to deal
13 with this in a general way, but I am not at all clear
14 that the witnesses have had an opportunity to review
15 these series of exhibits that were filed.

16 MR. D. POCH: Okay. These, of course,
17 were filed some time ago, but I appreciate that we
18 didn't specifically direct them to them.

19 So, let me try, if I may, to put some
20 very general questions, and see if we have some general
21 agreement here.

22 Q. On page 15 there is a figure 14, and
23 the zero line represents the 1988 basic forecast, and
24 then all of the blocks rising above or below it are
25 variations, in case of the black box, it is in

1 percentage terms, in case of the shaded box is in terms
2 of terawatthours, that other forecasts you have made or
3 Mr. Torrie has made differ from that '88 basic?

4 THE CHAIRMAN: Whose forecasts are they?
5 Are they Hydro's forecast?

6 MR. D. POCH: Q. If I understand this,
7 and, Mr. Burke, you could perhaps confirm for me then,
8 all of the forecasts represented there, with the
9 exception of the '88 EEMO frozen market share, are
10 forecasts that Ontario Hydro has generated, and I am
11 not asking you to comment on the whether we have got
12 the percentage shares right to the second decimal point
13 or anything.

14 MR. BURKE: A. I certainly can't comment
15 on that. The names are all names we use, that's really
16 all I can say at this point.

17 THE CHAIRMAN: Let me understand. The
18 black box are in percentages and the diagonal box are
19 in terawatthours; is that right?

20 MR. D. POCH: Yes. So the diagonal
21 blocks you would refer to the right-hand vertical axis,
22 and the black box you read relative to the left-hand
23 axis. And the horizontal line that goes at the zero
24 point is where the basic 1988 forecast is. Okay.

25 Q. Now, the conclusion I want to draw

1 from this, which is really quite simple, is that if you
2 were to take EEMO forecast in '88, and freeze Hydro's
3 market share as it was in '88, otherwise use the EEMO
4 forecast out to the year 2010 - which is what this
5 graph is all about, the year 2010 - you would get
6 something in the range of what Mr. Torrie has generated
7 here, the 1988 EEMO frozen market share scenario. That
8 is something about --

9 MR. B. CAMPBELL: I am sorry, isn't that
10 the very one that hasn't been prepared by these
11 witnesses, if I understand you correctly?

12 MR. D. POCH: That's exactly what I am
13 asking. I want to to know if the scale of impact is of
14 the scale we are showing.

15 MR. B. CAMPBELL: I am not at all clear
16 that the witnesses are in any position to answer this
17 at all.

18 MR. BURKE: I am going to have to look at
19 this.

20 THE CHAIRMAN: I have to understand the
21 question. I am a little bit confused.

22 MR. D. POCH: Let me not refer to Mr.
23 Torrie's graph for a minute then.

24 Q. Mr. Burke, of you froze Hydro's
25 market share as it was in '88 --

1 MR. BURKE: A. What do you mean by that?

2 Q. That is, the share of electricity.

3 A. Is that the share we forecast for
4 2010?

5 Q. The share as it actually was in 1988.

6 A. What the 1988 share was, yes.

7 THE CHAIRMAN: Which was? Just to remind
8 me, what did you say it was?

9 MR. BURKE: What are we saying? Are we
10 saying a share of what market?

11 MR. D. POCH: Q. Of the energy market.

12 MR. BURKE: A. Without transportation?

13 Q. Fine.

14 A. Well, is that what we have got here?
15 I don't know.

16 Q. Let's not worry about what we have
17 here.

18 A. It matters a bit, because the
19 transportation market can evolve in a way that makes
20 the shares --

21 Q. Let's leave aside transportation,
22 then.

23 A. Is that what is done here?

24 Q. I don't know and I am not asking you
25 to comment on that. I am trying to make it a little

1 simpler.

2 I am asking the question now: If we
3 froze Hydro's market share, leaving aside
4 transportation, at the level that it was in 1988. You
5 spoke about it earlier; something in the range of 20
6 per cent --

7 THE CHAIRMAN: Is it 20 per cent? Is
8 that what you are saying?

9 MR. D. POCH: Q. Is that right, Mr.
10 Burke, first of all? Are we in the right ballpark, 20
11 per cent?

12 THE CHAIRMAN: This is share of the
13 energy market; is that right?

14 MR. BURKE: Yes. That was the number
15 that I had difficulty finding this morning. I just
16 want to see if I can find it now come.

17 You see, the problem that we have is that
18 while we have a recommended electricity forecast, I am
19 not sure that we have tried to determine a recommended
20 energy forecast that goes along with it. There is an
21 energy forecast that results from the EEMO model, and
22 there an energy forecast that results from the end-use
23 model and I am not sure we have taken a position on
24 which of those energy forecasts constitutes the
25 recommended energy forecast.

1 Q. Let me simplify things, then. Let's
2 not talk to EEMO. Let me ask this: Mr. Torrie's rough
3 conclusion is that the growth in market share between
4 '88 and the year 2010, that you are projecting for
5 electricity, just that growth in market share.

6 A. Of the energy market?

7 Q. Of the energy market.

8 A. Yes.

9 Q. Just that growth in market share
10 results in new load on a scale greater than the entire
11 impact of your energy efficiency DSM projection?

12 A. Well, I think we will have to do the
13 calculations.

14 Q. All right. Would you do that then,
15 and you don't have to do it relative to Mr. Torrie's
16 numbers, or EEMO or anything, just as I posed it there.
17 Would you ponder that over the next few days and
18 perhaps on Monday morning you could tell us?

19 THE CHAIRMAN: Isn't there given in that
20 that you would have to know what you are projecting the
21 overall energy market at?

22 MR. BURKE: Yes, I am not sure whether I
23 am going to be able to give you a quick response on
24 that. I think we may have to make some simplifying
25 assumptions in order to do that. For instance, I mean

1 [3:58 p.m.] THE CHAIRMAN: Well, it is a start
2 anyway, and then we will see if we get in trouble from
3 there on.

4 MR. D. POCH: Yes.

5 Q. Just then looking at one element of
6 the market share fuel choice question, I would like to
7 just touch on the electric heating question.

8 If we turn up the interrogatories we have
9 provided at 1.7.62 and .63, this is discussed.

10 Now, we have just tried to get a bit of a
11 quantification from you here of how many megawatthours
12 of new electric heating you are forecasting. And is my
13 methodology correct, if I take, first of all, from
14 1.7.62, the difference between the 24 per cent market
15 share you are projecting, which is 13,843,000
16 megawatthours, and subtract what a 15 per cent market
17 share would be in the year 2010 - and that is given
18 there as well - we could get the growth for that
19 particular service in the residential sector, the
20 impact due to the growth in market share.

21 DR. BUJA-BIJUNAS: A. That's correct,
22 yes.

23 Q. All right. And we did that. The
24 number comes out at about 6,500,000 megawatthours per
25 year. Okay?

1 A. One small thing: I would just just
2 like to say that comes from the 1988 forecast. The
3 1990 forecast, the result would be somewhat different
4 insofar as we have lowered our UECs for electric space
5 heating.

6 Q. Okay.

7 A. So it is not necessarily the number
8 you would have in the 1990 forecast.

9 Q. All right. The methodology is
10 correct; the numbers have shifted a little?

11 A. Yes, they have shifted.

12 Q. Okay. And in the --

13 MR. B. CAMPBELL: I am having a little
14 trouble with the mathematics. Can you tell me how you
15 got the number you suggested?

16 MR. D. POCH: Yes.

17 Q. Doctor, help me here, but basically
18 we take the megawatthours you would project if you have
19 a 24 per cent share that you do anticipate, and
20 subtract from that the megawatthours that you would
21 have if you only had a 15 per cent share, which is the
22 share that you currently have.

23 DR. BUJA-BIJUNAS: A. That's right.

24 MR. B. CAMPBELL: That is the 13-million
25 figure less the 8-million figure?

1 DR. BUJA-BIJUNAS: That is right.

2 MR. D. POCH: That's right.

3 THE CHAIRMAN: Well, that comes to 5.2, I
4 hope.

5 MR. D. POCH: Okay. Yes. I realize
6 that.

7 THE CHAIRMAN: I don't trust my own
8 mathematics, but I think that is what it comes to.

9 MR. D. POCH: Well, you have certainly
10 got me there.

11 Q. It is about 5.2-million
12 megawatthours; and given your comments, it is very
13 ballpark.

14 DR. BUJA-BIJUNAS: A. Yes, it is
15 ballpark. The method is about right.

16 MR. BURKE: A. And maybe just to
17 clarify - I hope I am correct in this - that is
18 equivalent to 5.2 terawatthours, just so we don't have
19 all these zeros to carry around.

20 Q. And on the commercial side, in
21 Exhibit 1.7.63, if we do the same kind of calculation,
22 we see you are forecasting an increase in market share
23 from 13 per cent to 31 per cent.

24 And if you held constant at 13 per cent,
25 you would anticipate a little over 6-million

1 megawatthours. If the 31 per cent market share is what
2 is achieved, it is 14.5-million. So again, the
3 difference there is in the scale of --

4 A. 8.5.

5 Q. 8-1/2 million megawatthours or 8.5
6 terawatthours. So adding that up, 13.7 terawatthours.

7 Mr. Burke, perhaps I can impose on you.

8 A. Uh-huh. What would you like to know?

9 Q. What kind of capacity does that
10 increase in market share require, given --

11 A. Well, we will have to go back and
12 calculate that, I guess, with trying to find
13 appropriate load factors for that end use.

14 As we have indicated, we typically do not
15 convert individual end uses to peak because we don't
16 have extremely reliable information on load factors by
17 end use at this stage, but we have some numbers and we
18 will come up with something approximate.

19 Q. If I wanted to do a ballpark, I have
20 seen the figure .29 is the load factor for space
21 heating; is that in the range?

22 Doctor, you are nodding; is that right?

23 DR. BUJA-BIJUNAS: A. .29 is in the
24 range, yes.

25 MR. BURKE: A. For residential, I guess

1 the thing that I have to look at is commercial.

2 Q. Okay. Now, I know Mr. Torrie had
3 assumed that there was going to be lots of new heat
4 pumps, but when I looked at Exhibit 1.20.17, which is
5 in this package, I got a different impression.

6 A. Did you say 1.7.17?

7 Q. 1.20.17.

8 A. Oh. Sorry.

9 Q. So it is near the end of the package.

10 And I have just taken what is a little
11 section entitled, 'Table 2(b)' and section Table 2 --
12 or rather, 3(a) -- yes -- I am sorry, 3(b).

13 And just in new dwellings, we see that
14 the base board variety of electric heat, you are
15 anticipating a trend towards sort of 20/22 per cent
16 penetration, but on heat pumps, it is 6 or 7 per cent.

17 THE CHAIRMAN: You will have to... Where
18 are we?

19 MR. D. POCH: This I have taken from the
20 second page of the exhibit. About half way down there
21 is something entitled, 'Table 2(b), penetration of
22 electric base boards, new dwellings'; and I have
23 contrasted that with Table 3(b), 'penetration of heat
24 pumps, new dwellings'.

25 Q. So, is my understanding of what

1 penetration means, that you are expecting that for
2 every heat pump that goes in, there is going to be
3 three, three-and-a-half, I guess three new base board
4 heated houses? I am talking about only in the new
5 housing sector.

6 DR. BUJA-BIJUNAS: A. Yes. Basically,
7 it means in the year, say, 1989, 19 per cent of new
8 single-family dwellings chose base boards versus 6-1/2
9 per cent of new single-family dwellings chose heat
10 pumps.

11 Q. All right. And that relationship
12 holds pretty well through the period?

13 A. Yes, it does.

14 Q. Okay. And do you have anywhere that
15 you can refer me where you have made assumptions about
16 the relative penetration of those technologies and
17 others for electric heating in the commercial sector?

18 A. Okay. In the commercial sector, it
19 is not as explicit as in the residential sector.

20 In the COMMEND formulaism, the modelling
21 is for the penetration of electricity as a space
22 heating option. It is not differentiated into
23 explicitly heat pumps and base boards, et cetera.
24 However, the EUI you submit is adjusted to incorporate
25 the penetration of heat pumps. So, for example, we

1 have a 20 per cent penetration of heat pumps in offices
2 for offices using electric. So heat pumps are
3 implicitly put in as a percentage of supplying electric
4 space heating.

5 Q. All right. So what you have just
6 told me then, of whatever market share in the new
7 office sector that electricity is taking, one-fifth of
8 it will be heat pump?

9 A. It is about that number. I would
10 have to check it, but it is about that.

11 Q. Okay. That's fine. That is
12 certainly accurate enough for my purposes.

13 Have you done life cycle cost analyses of
14 costs for heating with electric, given different
15 appliances and gas, different appliances, in the
16 residential sector taking into account capital and
17 operating and your forecast for fuel price?

18 A. As far as underlying the end-use
19 forecast, we don't do a life cycle cost analysis.

20 What we do is that in the choice
21 equations, capital costs and operating costs and other
22 factors are determinants of fuel choice.

23 The extent to which each factor is
24 important in determining choice comes about as a result
25 of the calibration process where you try to reproduce

1 current decision-making using these various probability
2 functions.

3 So it is not a life cycle cost analysis
4 so much as a combination of factors to reproduce
5 current and expected future penetration.

6 And we have found that it is not always
7 the cheapest option which is picked up. Certainly, the
8 marginals would not represent that.

9 Q. Okay. I am interested -- we graphed
10 your price projections in as they appear in the energy
11 price trends reports in '88 and '90 for electricity in
12 the '90 for natural gas at page 16. Perhaps we could
13 put that slide up. Page 16 of Exhibit 107.

14 And to my untrained eye, it certainly
15 seemed that the price disadvantage of electricity is
16 growing over the forecast period, just on the fuel
17 price aspect.

18 MR. BURKE: A. Well, okay. I think my
19 sense was that the price disadvantage grew initially to
20 about the year 2000 and then converged slightly beyond
21 the year 2000.

22 Q. All right. Well, perhaps you can
23 check that and if we have graphed this incorrectly, let
24 me know.

25 A. Not that it really matters that much

1 for the purposes of this discussion, but are these
2 supposedly the efficiency adjusted numbers or are they
3 the raw --

4 Q. No, no. This is just raw - we
5 haven't manipulated this - raw price expressed in cents
6 per kilowatthour.

7 A. Just that we also present efficiency
8 adjusted numbers in those reports.

9 Q. Now, when you say "efficiency
10 adjusted", you are talking about the efficiency of the
11 end-use appliance?

12 A. That's correct.

13 Q. Okay.

14 A. I believe it was a point we made in
15 direct evidence, that historically, as well, there had
16 been a large gap between electricity prices and natural
17 gas prices, and that for non-price, a pure economic
18 price, operating price, reasons people were choosing
19 electricity obviously, and that we have discussed at
20 various points the sort of factors that can contribute
21 to that choice.

22 I would just like to emphasize the point
23 Dr. Buja-Bijunas made, that choices are not all or
24 nothing; that is, if you do a life cycle cost
25 comparison between two options, you don't expect 100

1 per cent of the market to choose the cheaper option
2 and, in fact, there is quite a wide distribution around
3 the sorts of results you would get by doing a life
4 cycle cost comparison.

5 MR. ROTHMAN: A. And --

6 Q. In fact -- sorry, go ahead.

7 A. I was just going to point to chart 4
8 on page 5 of Exhibit 14, which is the energy price
9 trends report, and that has a residential sector real
10 energy prices adjusted for efficiency for electricity,
11 fuel oil and natural gas.

12 And that chart suggests actually a
13 narrowing of the differential between electricity and
14 natural gas with that narrowing happening primarily
15 before 2005 in this, the way it looks in this chart.

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24 ...
25

1 [4:13 p.m.] Q. And throughout, I don't have it in
2 front of me, but perhaps you can just tell me,
3 throughout the period, electricity is at a price
4 disadvantage, I take it.

5 A. A significant price disadvantage,
6 that is correct.

7 Q. Significant.

8 MR. BURKE: A. But I think what is
9 important is that that has always been the case. It is
10 the relativity to each other that matters.

11 In the 1990s, electricity prices are
12 rising faster than gas prices. So that, effectively,
13 whatever has been influencing the market, that tends to
14 drive people to slightly less use of electricity in the
15 marketplace. And that is reflected in penetration
16 rates, in that interrogatory response, that actually
17 falls slightly in the '90s. And then beyond the year
18 2000, we have natural gas prices rising faster than
19 electricity, and it tends to push the market share, the
20 penetrations the other way.

21 Q. Doctor, somebody was talking with you
22 the other day about the social housing policy.

23 DR. BUJA-BIJUNAS: A. Yes.

24 Q. At page 502 of the transcript, you
25 said that the reason baseboards had been favoured in

1 the past in low income housing was, and I quote:

2 "It makes a low income housing unit
3 relatively inexpensive."

4 I take it from your discussion, then,
5 that you must have been referring to the first cost,
6 the capital cost.

7 A. I was referring to the builder's
8 cost, which is the capital cost that has to be put up
9 front.

10 Q. Now, in discussing your electricity
11 price trends, Interrogatory 1.30.1, the following
12 appears, you talk about higher capital program costs
13 and so on and lower amount, I take it, of nuclear
14 generation. You say:

15 "Also contributing to the increase in
16 prices is the inclusion in the current
17 forecast of cost allowances for
18 responding to issues that Ontario Hydro
19 will likely have to deal with over the
20 next two decades, but for which plans
21 have not yet been fully developed."

22 You might appreciate how that would have
23 piqued my curiosity. Can you tell us what you are
24 referring to there?

25 MR. BURKE: A. I think you will have to

1 talk to someone who has prepared the revenue projection
2 or the cost projection audit for the corporation.

3 Q. This was answered and given an ID
4 number of -- a 1 series ID number, which is why I
5 assumed you would be the ones who could answer to it.
6 Maybe Mr. Campbell can tell us what panel this can be
7 brought to.

8 THE CHAIRMAN: We are talking about
9 inclusion in the forecast, and I guess you say
10 something is included in the forecast. What did you
11 include, I guess.

12 MR. BURKE: It is not our forecast of
13 prices. We take the forecast of prices.

14 THE CHAIRMAN: I see. You don't make the
15 current forecast of cost allowances?

16 MR. BURKE: No.

17 MR. B. CAMPBELL: What this is speaking
18 to is the long-term projection of Ontario Hydro's costs
19 for producing the amount of electricity that Mr. Burke
20 is forecasting it needs to produce. It is not handled
21 by this division. If I could just have a moment to
22 check, I will give Mr. Poch a precise name to whom he
23 should put this question.

24 MR. D. POCH: Q. Well, perhaps while Mr.
25 Campbell is looking at that, Mr. Rothman, you have told

1 us you don't always accept the price forecast made
2 elsewhere in the corporation. I take it, then, you
3 must have investigated how they make that price
4 forecast?

5 MR. ROTHMAN: A. As I have said, I have
6 some information, but we don't investigate it in
7 detail.

8 Q. All right. So you are in no better
9 position than Mr. Burke to help me with this particular
10 concern?

11 A. No.

12 MR. BURKE: A. I think what Mr. Rothman
13 referred to before was previous forecasts that were
14 declining in real terms significantly, we felt were
15 difficult to accept at the time, but I'm not sure he
16 made -- I think, having adopted the current forecast,
17 or something very close to it in the 1990 load
18 forecast, the issue of whether it was too high or too
19 low didn't really arise this time.

20 MR. B. CAMPBELL: I think if you, Mr.
21 Poch, if you can put a star beside that question, and I
22 will let you know whether it is most appropriate for
23 Mr. Cowen on Panel 3, or my friend, Mr. Long, on Panel,
24 I believe, 10 or 11. But in any event, it can be
25 covered in one of those two areas for sure.

1 MR. D. POCH: Q. Doctor, I know you
2 aren't in a position yet to tell us about the impact of
3 the recently announced policy on electric heating not
4 being an option for low income socially-assisted
5 housing. Could you just let us know, once that
6 analysis is available; put it on the record in this
7 hearing?

8 DR. BUJA-BIJUNAS: A. Okay. One of the
9 assumptions we have to check is exactly how many
10 subsidized low income housing units are projected to be
11 built from now over the next twenty years or so. Once
12 we have that figure better in hand, we can come up with
13 an estimate.

14 MR. B. CAMPBELL: Perhaps we could ask
15 Ms. Couban to assist in that regard.

16 THE CHAIRMAN: Ask what?

17 MR. B. CAMPBELL: Ms. Couban to assist
18 us, if she can assist in providing that figure from the
19 government side, then we can calculate, I believe, we
20 can calculate the impacts.

21 MR. D. POCH: Q. I assume you would be
22 wanting to do that anyway. I'm not asking you to do
23 some work that you wouldn't otherwise be doing.

24 DR. BUJA-BIJUNAS: A. That was going to
25 be part of the 1991 update.

1 Q. Thank you.

2 THE CHAIRMAN: These kind of figures are
3 developed, there is a 20-year prediction for subsidized
4 low cost housing?

5 DR. BUJA-BIJUNAS: Well, basically that
6 is what we want to know. I have seen some figures, but
7 they seem to be ballpark, and I have to ascertain how
8 really concrete those figures really are, before I know
9 what the impact really is on electricity demand. But
10 it requires that sort of thing.

11 THE CHAIRMAN: Surely the number of
12 factors you have been talking about over the last few
13 days would influence that, impact on...

14 DR. BUJA-BIJUNAS: It could, yes.

15 MR. D. POCH: Q. Hopefully, you will be
16 able to give us at least some kind of scale of impact,
17 and we will appreciate it that it can't be very
18 certain.

19 DR. BUJA-BIJUNAS: A. Yes.

20 Q. We were discussing the potential --
21 someone was discussing, excuse me, the potential of a
22 move towards a carbon tax or other carbon restriction,
23 I think it was the MEA, with you. And Mr. Burke, one
24 of the scenarios you suggested was that this could lead
25 to a greater reliance on electricity in a fuel

1 switching situation.

2 Now, I'm not going to ask you to accept
3 these numbers, I just want to put them out as a
4 hypothetical for the basis of discussion, and these
5 numbers that I'm referring to are at page 17 of Exhibit
6 107.

7 Now, we have just done a very simple
8 calculation there of making some assumptions about end
9 use efficiency of future marginal appliances for
10 heating and the gas, and we have just taken the example
11 of the resistance heating, which we were told is the
12 bulk of what the choice would be for new electric
13 heating.

14 You can see what we have done. We have
15 made some assumptions for transmission efficiency,
16 generation efficiency, carbon input at the point of
17 generation or burn, and we have come up with numbers
18 that suggest that if coal is Ontario Hydro's marginal
19 fuel during the heating season, which I understand it
20 is at this time, electric resistance heat is something
21 in the ballpark of five times worse, in terms of its
22 carbon emission than a high efficiency gas furnace.
23 Obviously, there are many assumptions built into this,
24 and again, I won't ask you to confirm them. But
25 assuming that is so...

1 MR. B. CAMPBELL: Whoa, whoa, whoa, whoa.

2 THE CHAIRMAN: Where do you get that?

3 What is your derivation of five times worse?

4 MR. D. POCH: The emissions ratio to gas,
5 where gas comes out at one, electric resistance,
6 coal-fired electric resistance comes out at 4.94.

7 MR. B. CAMPBELL: What do you assume with
8 respect to the acid -- to the electro carbon?

9 MR. D. POCH: Assuming that coal is --
10 you can see that the relative numbers for the carbon
11 intensity of coal versus gas, the fact that a Btu, a
12 thermal unit into a coal generator gives you about a
13 third as many Btu's out, in terms of the form of
14 electricity and so on. And again, without getting into
15 a debate about each of these numbers, if you accept
16 that...

17 MR. B. CAMPBELL: Well...

18 MR. D. POCH: Q. Well, if you have a
19 problem, in terms of the order of magnitude of any of
20 these numbers, please speak up.

21 MR. BURKE: A. No, it is okay.

22 Q. But if we are in the ball park that
23 coal-fired electric resistance heating is four or five
24 times worse for carbon than natural gas, if that is the
25 case, would you change your answer that a carbon

1 constraint might --

2 A. No, I think what I said was that we
3 don't know at this point how a carbon tax would be
4 implemented, and what the supply options would be at
5 the margin, in a society that decided it would really
6 want to move away from fossil fuels. I don't think I
7 envisaged that I would be asked to substitute
8 coal-fired generation for high efficiency natural gas
9 furnaces as the implementation of a carbon tax. That
10 certainly is not a sensible thing to do, but that is
11 not what I was talking about either.

12 Q. All right. But in the time frame we
13 are talking about, in the balance of power plan, we
14 have coal as a marginal fuel, as making up a
15 considerable portion of the marginal burn at heating
16 season.

17 A. We are talking very hypothetically
18 here, Mr. Poch, about things. We don't even know
19 whether a carbon tax will be implemented, how
20 seriously, how rapidly everything will move.

21 At the same time, we don't know what
22 supply options would be adjusted or fast-tracked or
23 whatever, if society were truly to wish to get to grips
24 with this problem very quickly. But I think it would
25 not make sense.

1 If you want me to say it would not make
2 sense to substitute coal-fired generation centrally for
3 natural gas, at the burner tip in a house for space
4 heating purposes, from a carbon prospective, I would
5 agree with that. But that is not what I was talking
6 about. I think there are many scenarios one can
7 conceive of where that is not the trade-off being made.

8 Q. All right, I don't want to dwell on
9 this, Mr. Burke, but I had taken it as a given in your
10 plan that there was going to be coal on the system for
11 some time to come, even if you get approval for your
12 nuclear proposals, and that at the time of the heating
13 load on the system, marginal use is going to be
14 fossil-fired.

15 A. You can't have a hypothetical both
16 ways in my sense of it. If we are going to be
17 hypothetical about the carbon tax, I think we have to
18 assume that everything is hypothetical at this point,
19 and that the existing plan is not necessarily what we
20 are comparing against. I wouldn't want to speak
21 exactly to what is in the existing plan. I think that
22 is something you should ask other people about, but my
23 sense is that if you want to change the rules
24 completely, and we have adopted an objective of not
25 having -- of minimizing fossil fuel consumption, our

1 society doesn't just apply to natural gas, it would
2 also apply to electricity, and that we would try to
3 then find substitutes for fossil-fired electricity, and
4 there are some of those.

5 I'm not sure one can sort of say that we
6 are locked into using coal centrally as the alternative
7 in a hypothetical situation, as you are postulating.

8 Q. Are you aware of a discussion about
9 the imposition of hook-up fees for new electric heating
10 going on as a possible revenue policy direction?

11 A. No, I'm not aware of the specifics of
12 that. I think I said earlier this morning that I was
13 aware that the government was considering, or maybe it
14 was yesterday, an appropriate fuels policy of some
15 sort, but they had absolutely nothing concrete to say
16 about it.

17 Q. And are you aware that BC Hydro has
18 proposed, I think it is, an \$1,100 hook-up fee for a
19 single family dwelling in its recent rate proposal?

20 A. No, I'm not aware of that.

21 Q. Is it fair to say that if we went to
22 a hook-up fee for electric heating, just as we saw
23 existed in Ontario, back in, I think it was, the 1940s,
24 when we saw that example in the advertisements, but we
25 went for a significant one, or we got the same result

1 by government regulation, that that one choice could
2 change the basic forecast by literally millions of
3 megawatthours by the end of this forecast period?

4 A. Well, I think we looked at what --
5 the numbers you had us look at were actually the
6 numbers associated with maintaining the current market
7 share, and I presume what you are now talking about is
8 a situation where there is no market share at all at
9 the margin. So yes, there would be quite a difference.
10 But this is very much of a policy measure for which I
11 haven't even heard the government policy-makers
12 address.

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1 [4:30 p.m.]. I have heard internal rumours that such a
2 thing is being considered. It was really in the realm
3 of speculation at this point.

4 Q. So, I take it, you haven't prepared
5 an alternative scenario, an alternative forecast, an
6 alternative plan, where you consider the possibility of
7 exercising that choice, either you, the utility, as is
8 being done elsewhere, has been done in the past in
9 Ontario, or imposed by government?

10 A. As I have said before, we can get the
11 number almost instantly if someone asks us the
12 question. We don't have to prepare sensitivity. It is
13 sitting there.

14 Q. All right. Let's turn then to a
15 discussion of some of your methods, particularly in the
16 end-use area. We reproduced a number of
17 recommendations at page 19 and 20 of Exhibit 107 from
18 Porter Select Committee and EPTAP. You are familiar
19 with these recommendations, panel?

20 MR. ROTHMAN: A. I am familiar with the
21 Select Committee and the Technical Advisory Panel
22 recommendations.

23 MR. BURKE: A. I would acknowledge being
24 familiar with all of them.

25 Q. All right. And it's fair to say that

1 there has been a pretty consistent thrust from such
2 reviews that Hydro should increase its capability and
3 reliance in the end-use area?

4 A. Yes, and we have.

5 Q. And is it fair to say that a
6 couple of the reasons given for that are that it can
7 enhance your capability to do targeted DSM?

8 A. It can enhance your capability to
9 analyze DSM.

10 Q. You would agree with that?

11 A. Yes.

12 Q. You are agreeing with that. And that
13 at least in the opinion of those who have been writing
14 such reports, it may improve the forecasting overall?

15 A. Well, that's something I think that
16 the jury is still out on, but there is a sense that it
17 ought to contribute to improving the forecast, yes, the
18 quality of the forecast.

19 Q. I would like to look at the graphic
20 at page 21 of our package, Exhibit 107. This has been
21 touched on by others so I don't think we need to spend
22 a great deal of time. This a graph simply showing that
23 residual category in residential and showing the trend
24 as projected in the '89 and the '90 end-use forecasts
25 for its contribution.

1 We have already heard, and you have
2 referred us to page 13 of Exhibit 16, Doctor, that you
3 do the forward projection of this with basically a
4 regression, an econometric technique?

5 DR. BUJA-BIJUNAS: A. That's correct.

6 Q. Given all the emphasis that's been
7 placed by external agencies on the need for
8 disaggregated forecasts, I am wondering why you don't
9 take out of that category larger uses like clothes
10 dryers or lighting, or furnace fans which are
11 reasonably predictable in their use, or even TVs to the
12 extent that you can get market data from that industry
13 and track them separately?

14 A. One of the reasons we left in
15 lighting and clothes dryers, et cetera, was so as to
16 better allow this estimation of the regression
17 equation.

18 By the time you would take out clothes
19 dryers, lighting, et cetera, you would be removing
20 about three quarters of the consumption of this "other"
21 category. Some of the residual components are a bit
22 more difficult to define and more difficult then to
23 regress.

24 Although we did it as a regression
25 equation, we were fully aware of the relative

1 contribution of clothes dryers, lighting, et cetera, to
2 the "other" category, fully aware that they do account
3 for three quarters of the consumption, and because of
4 that, the future growth of that "other" category takes
5 into consideration the fact that these are saturated
6 end-uses, and therefore it goes down to about 2.8 per
7 cent versus historically it was about 5.5 per cent. So
8 although it's done with a regression equation, it's
9 done with a regression plus some judgment, because we
10 are aware of the various 20-odd categories contributing
11 to that "other" category.

12 Q. If we turn to page 22 --

13 A. Can I make a general statement about
14 21?

15 Q. Yes.

16 A. I think this is a really good example
17 of why I am very uncomfortable with this concept of
18 always focussing on percentage contribution and always
19 looking at share. If you look at 1990 forecast, it
20 looks as though we suddenly dramatically increased our
21 perception of what goes on in "other".

22 What that share does is it reflects not
23 just growth in "other" but what is happening in the
24 "non-other" category. In our 1990 forecast we were
25 able to get better information on the unit energies of

1 space heating and other traditional, if you want to
2 call it, end-uses as a result of the residential audit
3 study that was done at Ontario Hydro. By putting in
4 these new unit energy consumptions, that consumption
5 went down somewhat making the share of "other" look
6 larger. It's both of these things in combination.

7 In point of fact, the growth of "other"
8 in the 1990 forecast, which is the upper forecast, is
9 2.8 per cent, and the '89 forecast, which is the lower
10 forecast, is 3.4 per cent. So the "other" is actually
11 growing much more strongly in the '89 forecast, and
12 that wouldn't appear to be the case just looking at
13 this particular overhead, because you are focusing on
14 share of total consumption and that can be somewhat
15 misleading.

16 Q. Okay. So those are the absolute
17 numbers as opposed to the change in the share, the
18 percentages you just --

19 A. Yes, the percentages are the actual
20 growth of that "other" category.

21 Q. But this "other" category, this
22 residual category is accounting for some, I think the
23 number was 74 or 75 per cent of the growth in the
24 residential sector over the forecast period?

25 A. That's right, yes.

1 Again, realize what you just said. It
2 accounts for 74, and I question whether that in itself
3 is somehow a bad number. If, for example, there were
4 no growth in space heating or any other end-uses, it
5 would 100 per cent. If there is a tremendous growth in
6 space heating it might be 10 per cent. Of itself that
7 number does not have very much meaning.

8 Q. Well no, I am just trying to suggest
9 that since this is the part of the residential load
10 which is -- how much of that 75 per cent of growth that
11 is attributed to this, how much of that is due to
12 shrinkage in the enumerated categories and how much of
13 it is due to - can you separate that out - due to
14 growth of these?

15 A. Actually you can separate it out
16 also. All that information is in the end-use main
17 report for 1990 at the appendix.

18 Q. Can you just us a ballpark, a
19 ballpark estimate?

20 A. Of?

21 Q. Of the relative importance of the
22 growth of the loads that fall into residual as opposed
23 to the growth or the decline of the proportion that the
24 "other" products make up. I mean, you have said 75 per
25 cent of the growth in the residential sector from until

1 to, was it 2010?

2 A. To 2015.

3 Q. 2015, is happening in this category.

4 A. That's right.

5 Q. Isn't that a fair statement? Doesn't
6 that say something is going on here, and we ought to be
7 looking at that very carefully?

8 MR. BURKE: A. Maybe it says something
9 about what is going on in the--

10 DR. BUJA-BIJUNAS: A. In the other
11 categories.

12 MR. BURKE: A. In the "non-other"
13 categories.

14 DR. BUJA-BIJUNAS: A. One of the things
15 about the "non-other" category, why it's going down is
16 that for 1990 forecast we have imposed standards which
17 apply only to those end-uses that are not in "other".

18 There are a lot of things going on and I
19 wouldn't read in too much in their exact meaning of
20 that 75 per cent.

21 Q. All right, that's helpful.

22 MR. ROTHMAN: A. I think the point here
23 is - and perhaps I am being redundant - but I think the
24 point here is that if you want to look at the forecast,
25 what we need to look at is the level, and what is

1 important in the level is the contribution that each of
2 the end-uses makes. So that focusing on "other",
3 simply because in this forecast it happens to be the
4 one that grows, doesn't really tell us as much about
5 the forecast as it would to understand what is
6 happening to each of the components. So the fact that
7 the "other" constitutes a large fraction of the growth
8 is at least partly a function of the fact that the
9 other end-uses are growing either not at all or more
10 slowly.

11 Q. We are looking for opportunities to
12 scale that growth in the residential sector, is it fair
13 to say there is usually more opportunity in a new load
14 than in an existing load?

15 MR. BURKE: A. Are you going to deny
16 people their fax cards or whatever it is?

17 Q. No. I am just suggesting, Mr. Burke,
18 that if we can do something to influence say the
19 efficiency of whatever this new load is, it's often
20 easier to do in a new application than in an existing
21 application. You have said standards are going to
22 capture the growth first.

23 A. Where you can actually regulate
24 standards. It's very difficult to develop standards
25 for products that don't exist yet.

1 [4:45 p.m.] MR. D. POCH: Okay. Mr. Chairman, did
2 you want to go to five today or a quarter to five?

3 THE CHAIRMAN: Go until five and we can
4 stop there.

5 MR. D. POCH: Fine. In either case, I
6 can't finish, unfortunately.

7 Q. In the industrial sector of the
8 end-use forecast - we don't need to turn it up - but I
9 understand there are 14 industrial classifications that
10 are treated separately in your document, and each of
11 those can have a number of SICs within it.

12 And you have gone through, in your oral
13 evidence, and in the exhibit, and given a prose
14 description, in many cases, of offsetting trends. We
15 see a trend towards electro-technology in the steel
16 industry. This is offset by a trend towards higher
17 efficiency and more conservation.

18 DR. BUJA-BIJUNAS: A. Yes.

19 Q. And out of the mix, you have said,
20 "and here is what we are forecasting."

21 Is there somewhere in the evidence where
22 you have provided what those offsets are, your
23 assumptions for each of those 14 categories for new
24 load due to a move to electro-technologies as opposed
25 to new conservation?

1 A. The most fully-documented cases are
2 for the iron and steel industry and for the cement
3 industry, where we have the INDEPTH model and all the
4 processes that underlie that model documented in terms
5 of kilowatthour use, a kilowatthour per tonne use.

6 Q. You don't, then -- go ahead.

7 A. For the other industries, we don't
8 have them documented in a final report format. I would
9 have to pull out all my computer files.

10 Q. Perhaps --

11 A. Oh, if you would like, I can give you
12 all the flow charts, if that is of --

13 Q. Well, I wanted a quantification and I
14 imagine the flow charts would be the same as a
15 different version of this prose; is that fair?

16 A. The flow charts would list every
17 technology included as an option in the processing and
18 production of various materials in the iron and steel
19 industry.

20 Q. They aren't a quantification of
21 others.

22 A. Oh, I am sorry, they are not in all
23 the other industries.

24 Q. Yes, but they aren't the
25 quantification; they are just the options you

1 considered?

2 A. Well, there is a quantification. I
3 am saying I would have to go through all of my computer
4 files.

5 Q. I don't want to put you --

6 A. Every process has a kilowatthour per
7 tonnage, et cetera, associated with it.

8 Q. I don't want to put you to too much
9 trouble. Perhaps I could ask you for the four that
10 represent the group 1, which you have indicated are the
11 majority of the load in the industrial sector, if you
12 could provide us with them.

13 A. You want the energy intensities of
14 every process underlying the models for those four
15 industries?

16 Q. I want to be able to break apart to
17 what extent load growth is due to move to
18 electro-technologies and what they are.

19 A. Okay.

20 Q. And then to what extent that has, in
21 turn, been offset by assumptions about improved
22 efficiency.

23 A. I can do that, but you will have to
24 give me a fair amount of time since--

25 Q. It is not a problem.

1 A. --I am the industrial analyst these
2 days, and I need time to --

3 Q. I have no problem at all with that.
4 I have a hunch we have to the new year, I fear.

5 MR. B. CAMPBELL: On that time frame, we
6 will do what we can.

7 If we have problems, Mr. Chairman, I
8 would still like the opportunity to come back to you.

9 I am completely unable to make any
10 judgment as to how much work is involved and so on, and
11 so I would like to reserve my rights in that regard,
12 but we will take it on.

13 THE CHAIRMAN: That will be fine.

14 MR. D. POCH: Q. Now, Doctor, I can't
15 help but ask, when you expressed a wish on the record
16 this morning that there was more than one person
17 analyzing these various industries, the one person at
18 present is, in fact, yourself?

19 DR. BUJA-BIJUNAS: A. Yes. There
20 normally is one person and that person is no longer
21 with us, so I have had to take on the work of that
22 individual.

23 Q. Okay. And just to round out the
24 record then, page 22 is the commercial miscellaneous
25 electricity use. And let's just make sure we have it

1 right.

2 In 1989, there was just this one category
3 'miscellaneous.' That is the upper line. But in 1990,
4 you have broken the miscellaneous category into two
5 categories, one being office equipment and one being
6 miscellaneous?

7 A. That's correct.

8 Q. All right. So we have simply added
9 those together to get the dotted line -- or, I am
10 sorry -- yes, the dotted line.

11 So if we wanted to compare as between the
12 '89 and '90, it would put those two top lines?

13 A. I have not checked the numbers.

14 Q. No, I am not asking you that. I just
15 wanted to make sure that --

16 A. If you have taken the numbers out of
17 the reports and you have come up with these shares, I
18 will trust that they are correct.

19 Q. And I am not even asking you to
20 confirm that. I am really just asking you to confirm
21 that the two numbers for miscellaneous and office
22 equipment are, in fact - if you add them together, they
23 are one and the same as the previous miscellaneous?

24 A. As the previous miscellaneous, yes.

25 Q. Now, the word 'tuning' has come up

1 and we spoke of it earlier, and I wanted to understand:
2 There is this 10 terawatthour adjustment we spoke of
3 earlier today, at the splice between the end-use
4 forecast and the end of the short-term forecast.

5 And then there has also been mention of a
6 5 terawatthour tuning in the commercial office
7 miscellaneous categories.

8 Is the 5 included in 10? Is it in
9 addition - a different step in the stage of the
10 process? Can you clarify that for us?

11 A. If my memory serves me right, there
12 was the 10 for the short term and the 5 is for tuning
13 to the recommended. So that has a separate 5 at the
14 end of the forecast period, which is 2015.

15 Q. I have one question to ask just for
16 clarification: For page no. 22, for the '89 curve and
17 the '90 curve, these are both the tuned forecasts that
18 you took, or did you take one as untuned or one tuned?

19 A. I would hazard that the '89 certainly
20 looks like it is tuned, but I can't really tell just
21 looking at the 1990 forecast.

22 Q. Did you use the appendix document
23 that is part of Exhibit 17?

24 A. I don't know, but you having put
25 those comments on the record, I will have my analyst

1 look at this before he gives any evidence, and I take
2 that as a concern you may have.

3 Q. The purpose of this was not to look
4 at any particular number but more to look at the slant
5 of the line. I thank you for that comment.

6 MR. BURKE: A. I would just like to add
7 something to what Dr. Buja-Bijunas said: I think in
8 her testimony this morning, she implied that having
9 tuned the forecast in the short term to get to the
10 1995, there were some considerations of the
11 implications of that tuning beyond 1995; that is, if
12 certain things were done, that there might be offsets
13 after 1995.

14 So it is not clear to me that you can
15 necessarily derive a total by summing the two numbers.

16 Q. Yes. So to be clear then, the 10
17 terawatthour is the difference in the tuning measured
18 in 1995, and it may be different by the time we get out
19 to 2015. It may be amplified. It may be offset.

20 DR. BUJA-BIJUNAS: A. That's correct.

21 Q. And the 5 terawatthour tuning, that
22 refers to the difference between the end use and the
23 chosen commercial forecast, and that is as measured at
24 the end of the forecast period?

25 A. That's correct.

1 Q. All right. And these two are not the
2 same thing and they are going to add, but we can't add
3 them simply. There may be some

4 MR. BURKE: A. That is what I wanted to
5 clarify.

6 Q. Fair enough.

7 Doctor, when you run the end-use models
8 before you have made all your assumptions, as you make
9 these assumptions, do you confer with Mr. Burke and the
10 people running the EEMO model? And is there a give and
11 a take from both sides?

12 DR. BUJA-BIJUNAS: A. We discuss our
13 results after we already have preliminary forecasts.
14 We work on the forecasts June, July and August.

15 And usually, by the beginning of
16 September, when we have, more or less, reached where we
17 feel the end use should be, we cross-compare with EEMO
18 just to get a feel for where they are, partly so that
19 we know what our various arguments are when we address
20 Mr. Burke.

21 Q. Yes. And when you go through that
22 process, and then when you address Mr. Burke, between
23 that point and September, as you have said, until the
24 finalization of the end-use forecast, and from that
25 point on the EEMO side until the finalization of the

1 EEMO forecast, would we expect to see that this
2 discussion and Mr. Burke's supervision would result in
3 somewhat of a convergence of the two forecasts in any
4 year typically?

5 MR. BURKE: A. I think I should comment
6 on that, really. Essentially, this year we had a
7 divergence. We were quite concerned about our
8 forecasts for the commercial sector, as it is the one
9 for which in the end we have had to apply some
10 judgment. We did not accept one or the other. We had
11 to go in between, as we have had to in previous years.

12 And the more we worked on the commercial
13 sector, the more the results for EEMO, in fact, went
14 higher. And I don't believe there was much change at
15 all in the end use.

16 And certainly, if there was some -- I
17 mean, you can ask Dr. Buja-Bijunas, but I don't think
18 the effect of what was going on there was to in any way
19 change the end-use forecast.

20 Q. Typically, Doctor, we have heard that
21 the EEMO typically gives a higher result than the end
22 use in any given sector.

23 DR. BUJA-BIJUNAS: A. Typically.

24 Q. And I am just asking: In this
25 process that goes on, typically, do you end up

1 adjusting your end-use numbers, if anything, upwards?

2 A. You mean after we produce our best
3 estimate end use?

4 Q. After you produce your preliminary
5 estimate, before you finalize it in the -- whatever
6 changes occur between your preliminary, which you say
7 you develop off in a closet somewhere, and your final.

8 Is there a tendency for the end-use
9 forecast to rise because of these discussions and for
10 the EEMO to fall?

11 A. No. The end use is the end use.

12 Q. Okay.

13 A. The recommended is, you know,
14 something else entirely.

15 But when we present the end use, that is
16 the best that we can come out with or what we feel
17 comfortable with.

18 If we do any adjustments, they are not
19 very material adjustments. It might be due to
20 consistency checks of some UEC that has come through
21 from other source or something.

22 But the underlying assumptions are -
23 that is what the end-use group feels should be the
24 forecast.

25 Q. Okay. So maybe I misunderstood the

1 phrase 'preliminary' then.

2 A. Preliminary means three months of
3 work or three months of intensive work produced in the
4 forecast.

5 Q. Yes. So there isn't, if ever, any
6 significant change made in the end-use forecast at the
7 end of that period until when it is actually published
8 in a finalized form?

9 A. The only change that might occur
10 might be the short-term tuning.

11 Q. Yes. Okay.

12 A. But not, you know, in fact, getting
13 to the 1995.

14 Q. Yes.

15 A. But as far as underlying assumptions
16 regarding space heating share and whatever, that is
17 what it is.

18 MR. BURKE: A. I would like to add
19 something here: I made a point in my direct evidence
20 that there are different kinds of information that each
21 of these models has to offer about the future and it
22 wouldn't be very much use to me if we compromised each
23 of them in the course of preparing the individual
24 forecasts.

25 The information is of best use to me if

1 it is presented in a pure form and each of the
2 processes for the econometric and the end-use forecast
3 are done deliberately independently.

4 I mean, there is sharing of energy data
5 and raw materials for modelling purposes, that kind of
6 thing - articles, that kind of stuff. But in terms of
7 results, the results are as pure of each kind as we can
8 make them, and that is how they are of use.

9 MR. D. POCH: All right. Mr. Chairman,
10 that is a convenient point to break.

11 THE CHAIRMAN: Fine. Now, do you still
12 think you will be finished Monday?

13 MR. D. POCH: Oh, I will certainly finish
14 Monday, Mr. Chairman, and hopefully short of the lunch
15 break.

16 THE CHAIRMAN: And you will be next on,
17 Mr. Greenspoon?

18 MR. GREENSPOON: Thank you.

19 THE CHAIRMAN: And I forget now who
20 follows.

21 How long do you think you will be, Mr.
22 Greenspoon?

23 MR. GREENSPOON: I don't know, sir. I
24 would guess between three and six hours.

25 THE CHAIRMAN: So that we will finish

1 Monday anyway?

2 MR. GREENSPOON: Hopefully.

3 THE CHAIRMAN: I mean, Monday would be
4 over and you wouldn't be finished. (Laughter)
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1 [4:59 p.m.] MR. B. CAMPBELL: Mr. Chairman, I wonder
2 if before we leave this week, I don't know who, which
3 of all of the parties are here, but there is a natural
4 interest in Panel 2, as to whether there is any
5 possibility of them getting reached on Thursday.

6 My guesstimate right now, given this, is
7 that it is very unlikely that they will be reached
8 Thursday. Certainly if we have IPPSO, Energy Probe...

9 THE CHAIRMAN: I haven't got my list with
10 me.

11 MR. B. CAMPBELL: There is quite a long
12 list. But if you could -- would it be feasible, if
13 people here could just give me, give us a brief
14 estimate, I know these things are difficult, just to
15 help us make this judgment in getting ready for Panel
16 2?

17 THE CHAIRMAN: Perhaps those who are here
18 could wait just a few minutes after we adjourn, and you
19 could discuss that.

20 The trouble is, of course, as various
21 cross-examinations go, some of the issues get put away
22 and -- not put away, I mean, but as far as this panel
23 is able to go with them, and that may reduce or in rare
24 cases extend the scope of cross-examination.

25 Mr. Monger, you are going to be

1 cross-examining, I take it, are you for CAC?

2 MR. MONGER: Actually Mr. Rosenberg is
3 going to be coming in for that purpose.

4 THE CHAIRMAN: I see.

5 MR. MONGER: We don't anticipate we will
6 be more than a couple of hours.

7 MR. H. POCH: Mr. Chairman, on behalf of
8 the City of Toronto, we don't anticipate being more
9 than an hour.

10 THE CHAIRMAN: I haven't got the list in
11 front of me. Mr. Shepherd, do you have any rough idea?

12 MR. SHEPHERD: We anticipate between five
13 and seven hours.

14 THE CHAIRMAN: Yes. Well, we will
15 adjourn then.

16 Yes, Ms. Kleer?

17 MS. KLEER: I will be probably three to
18 four hours.

19 THE CHAIRMAN: We are getting close to
20 Thursday anyway. And then you are going to have some
21 reply, aren't you?

22 Ms. Couban, do you have any idea?

23 MS. COUBAN: It is difficult to say, but
24 probably between one and two hours.

25 THE CHAIRMAN: You will have some reply?

1 You have no idea yet whether you will or how much it
2 will be, but it might be some.

3 MR. B. CAMPBELL: I know I have some, but
4 I don't generally spend a lot of time on that, unless
5 it is absolutely necessary. I guess, and I will
6 contact Energy Probe and try and get an estimate from
7 them and one or two others. I think this certainly
8 helps me make some kind of judgment about it. Thank
9 you.

10 THE CHAIRMAN: Thank you.

11 THE REGISTRAR: This hearing will adjourn
12 until Monday morning next at 10:00 o'clock.

13 ---Whereupon the hearing was adjourned at 5:02 p.m. to
14 resume Monday, May 6, 1991, at 10:00 a.m.

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